

Introduction

The Bureau of Reclamation (Reclamation) developed this *Water Management Planner (Planner)* to assist its water service contractors (contractors) in the preparation and implementation of Water Management Plans (Plan) as required by the Reclamation Reform Act of 1982 (RRA) and the Central Valley Project Improvement Act of 1992 (CVPIA). The *Planner* is designed to be used by both agricultural and urban contractors of all sizes and complexities. The *Planner* can also be found on the Internet at www.usbr.gov/mp/watershare/.

The CD inside the cover contains this *Planner* and several publications that may be helpful to you while completing your Plan, such as The Methodologies for Evaluating Canal and Reservoir Lining Best Management Practices (BMP), along with the BMP calculations for urban contractors.

Tab 1: Introduction.

Tab 2 and 3: Water Accounting Table Instructions. Instructions that guide you while filling out both the agricultural and urban contractor water accounting tables have been included. These tables are found on the CD and have been revised to correspond with the new water balance structure as presented in this *Planner*.

Tab 4: Water Balance Structure. A water balance structure is a useful water management tool, because it requires an accounting of all water within specified bounds in a district. This water balance structure has primarily been developed to support water management planning and is included for your reference. It is suggested that you become familiar with it and compare it with what you are using.

Tab 5: Plan Format. The Plan Format is provided in hard copy and on the CD so that Contractors can “fill-in-the-blanks” by hand or (preferably) on the computer. If you need additional information about how to fill in the blanks, refer to the Guidebook.

Tab 6: Guidebook. The Guidebook is designed to provide step-by-step instructions on completing a Plan. It includes examples of different ways that other contractors have implemented BMPs.

Tab 7: 2002 Standard Criteria for Evaluating Water Management Plans (Criteria). The Criteria, upon which the *Planner* is based, is included for your reference.

Tab 8: Water Measurement. A section on water measurement devices.

Tab 9: Helpful Web Sites.

Tab 10: Quantifiable Objectives (QOs) by Agency. Alphabetical agencies with the QOs listed for each agency.

The *Planner* is not the complete or final authority in water management planning. Reclamation will continue to look for new information and ways that will assist contractors with their Plans. Finally, Reclamation would like your suggestions for improving this planning tool.

Draft Plans should be submitted to your local area office for review at the below listed addresses. After Plans are reviewed and deemed adequate, the Mid-Pacific (MP) Regional Office (Regional Office) will request submission of final Plans to your local area office at the addresses below.

Bureau of Reclamation
Central California Area Office
Attention: Pete Vonich
7794 Folsom Dam Road
Folsom, CA 95630-1707

Bureau of Reclamation
South-Central California Area Office
Attention: David Woolley
1243 N Street
Fresno, CA 97321-1813

Bureau of Reclamation
MP Construction Office - Willows
Attention: Dennis Perkins
PO Box 988
Willows, CA 95988-0988

Criteria - 2002

Five-Year Plan Review Process

The contractor submits the Plan to the appropriate area office water conservation specialist who performs the initial Plan review. Additional information may be requested from the contractor at this time. After this initial review phase, the area office forwards the Plan to the Regional Office's Water Conservation Program for staff review. This review determines whether the Plan is adequate or needs additional work. If the Plan needs work, the Regional Office will call or send a letter to the contractor indicating the suggested changes and requesting submission of a revised plan to the Regional Office. The Regional Office will keep the area office informed of revisions and coordination with the contractor. If the Plan is adequate, then a letter will be sent to the contractor requesting three copies of the Plan be sent to the Regional Office along with a copy of the contractor's Board Resolution. It is Reclamation's intention to complete this review process within 90 days. Once the Regional Office receives the documentation, a notice will be sent to the Federal Register advertising the Plan and requesting public comments. If there are no comments, then the process is complete. If there are comments, then the Regional Office will coordinate with the contractor regarding potential revisions to the Plan.

Annual Updates:

The contractor submits the Annual Update on-line via Reclamation's website.

Agriculture: www.usbr.gov/mp/watershare/

Urban: <http://www.cuwcc.org>

The area office will review the Annual Update and determine if it is adequate or requires revision or additional information. If it needs work, then the area office will call or send a letter to the contractor indicating the suggested changes and requesting submission of a modified Annual Update. If it is adequate, then the Annual Update is sent to the Regional Office where it is logged in.

MP Region:

Contractors should use the Plan Format located at Tab 5 in this *Planner* and in the enclosed CD. For assistance, please contact the water conservation specialist in your area. Contact information can found on the inside cover of the *Planner* to the left.

Who Should Use This Planner

Reclamation recommends that all contractors complete a Plan using this *Planner*. However, this *Planner* is much more useful if your Plan is subject to CVPIA Criteria. The Criteria are included in Tab 7 of this *Planner* and apply to Plans submitted to Reclamation as required by applicable Central Valley Project (CVP) water delivery contracts or any other contracts that specifically invoke the Criteria.

Exceptions. The following are excepted from the requirement to prepare a Plan using the Criteria:

- All contractors that receive **only** irrigation water from any Federal Reclamation project, and deliver said water to less than 2,000 acres of land.
- All contractors that receive **only** municipal and industrial (M&I) (urban) water from any Federal Reclamation project, and provide said water to less than 3,300 people.
- All contractors that receive less than an annual average of 2,000 acre-feet (AF) from any Federal Reclamation project.
- Contractors that do not receive water from the CVP, and CVPIA Criteria is not an added contractual condition of your contract.

Flexibility and Coordination

The Criteria recognizes the differences between contractors, and have been written to be flexible enough to allow each contractor to develop and implement the types of programs that will best accomplish improved water management within their boundaries. In some cases, the contractors may choose to pool resources and implement joint programs. The Criteria not only allow, but also encourage, joint efforts toward program implementation.

Guidebook

Definitions

1. Agricultural Water Management Council (AWMC) - A consortium of agricultural water agencies and public interest groups to implement water conservation practices in California. This effort was formalized in a MOU signed in 1996. AWMC continues to grow with new signatories being accepted every year. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
2. BMP - A policy, program, practice, rule, regulation and/or ordinance, or the use of devices, equipment, or facilities that meet either of the following:
 - a. An established and generally accepted practice among contractors that results in more efficient use, conservation/management of water, or
 - b. A practice for which sufficient data are available from existing water management projects to indicate that significant efficiency improvements or management related benefits can be achieved, that the practice is technically and economically reasonable and not socially or environmentally unacceptable, and that the practice is not otherwise unreasonable for most contractors to carry out.
3. CALFED - State-Federal program formalized in June 1994 upon the execution of a Framework Agreement by State and Federal agencies having management and regulatory responsibility in the Bay-Delta Estuary. The mission of CALFED is to develop and implement a long-term comprehensive plan that will restore the ecological health of the Bay-Delta.
4. CUWCC - A consortium of urban water agencies and public interest groups to implement water conservation practices in California. This effort was formalized in a MOU signed in 1991. CUWCC continues to grow with new signatories being accepted every year. Signatory water suppliers agree to develop and implement comprehensive conservation BMPs using sound economic criteria.
5. Conjunctive Use - The planned and coordinated use of surface and ground-water supplies to increase water supply reliability, as may be included in a Ground Water Management Plan or Banking Program.
6. Contractor - Entities that contract with Reclamation for urban and/or for agricultural water.
7. District - The physical boundaries of the contractor's service area.
8. Five-Year Plan Revision - The revision of a Plan using the most recently adopted Criteria.

Under RRA, contractors are required to re-evaluate and re-submit to Reclamation their respective Plans every 5 years.

9. Ground Water Banking Program - The intentional storage of supplies in subsurface aquifers beyond coincident irrigation needs with the expectation of subsequent retrieval for beneficial use. The contractor should have a reasonable rationale of how the contractor or customers will benefit when the water is retrieved for beneficial use. Ground-water banking usually involves keeping an account of water input and the subsequent use by predetermined or specified parties. Ground-water recharge alone is not a Ground Water Management Plan or a Ground Water Banking Program. An acceptable Ground Water Management Plan or Banking Program must have a method of retrieval of such water for beneficial use.

10. Ground Water Management Plan - A set of practices and management actions that improve ground-water conditions with the intent of protecting and/or increasing the benefits including the sustainability of the ground-water aquifer.

11. Ground-Water Recharge - The natural or intentional infiltration of surface water into the zone of saturation.

12. Implementation - Achieving and maintaining the staffing, funding, and the priority levels necessary to achieve the level of activity called for in the descriptions of the various BMPs. And to satisfy the commitment by the contractor to use good-faith efforts to optimize benefits from implementing BMPs.

13. Retailer - A contractor who sells all water directly to the water user.

14. Riparian ET - ET from non-crop vegetation usually growing along the banks of water conveyance and storage facilities.

15. Water Conservation/Water Management - Use of less water to accomplish the same purpose(s) or the use of the same amount of water to accomplish additional benefits. An example of the latter is implementation of a BMP that results in increased total crop production using the same amount of water. Water management that results in the increased benefits of water can be achieved through the implementation of BMPs identified in the criteria. For the purpose of the Criteria, water conservation is considered the same as water management.

16. Wholesaler - A contractor who sells water to entities who resell the water usually to multiple customers.

Section 1: Description of the District

A. History

Give a short (one page) historical overview of the district. This is the place to express any significant historical events affecting the current state of the district and a place to generalize any trends that appear likely to influence the future. For agricultural districts, describe changes in irrigated acreages, cropping patterns, and evolving irrigation methods.

Enter the following information in the Plan Format (Section 1, page 1)

1. Date district formed and original size.

Enter the date that the district was legally organized. Enter the date of the first contract with Reclamation. Enter the original size of the district in acres (there are 640 acres in a square mile). Enter the date of the data entered in this Plan (within the last 2 years).

2. Size, population, and irrigated acres.

For the current year, enter the current district size (acres), urban population that is served (treated drinking water), and irrigated acres served.

3. Water supplies received.

Enter the amount of water (in AF) received by the contractor during the year. Enter the actual amount of water received from each of the listed sources.

Federal Urban Water - Water that is provided for urban, landscape irrigation, CII use.

Federal Agricultural Water - Water that is provided for agricultural irrigation use.

State Water - Water from the SWP.

Local/Other - Water transferred into the district is an example.

Local Surface Water - Santa Barbara's Gibraltar Reservoir is an example.

Upslope Drain Water - Water that flows from one farm to another (applies only to agricultural contractors).

District Ground Water - The supply of water that the contractor pumps and supplies to customers

through its distribution system.

Transferred Water - The amount of water the contractor bought, sold, or traded.

Reclaimed Water - The amount of urban treated waste water provided to contractor customers.

Other Water - Incidental agricultural, environmental, and all other non-agricultural, Federal water.

4. Annual entitlement under each right and/or contract.

Provide information on the contractor's entitlement or contractual amount from each source (Reclamation, SWP, ground water from adjudicated basins, drain water contracts, long-term transfer agreements, etc.). Please include each contractor's identifying number and any contract restrictions that affect the contractor's water management. Examples of restrictions include time of delivery or amount of water available per month. If these restrictions make some BMPs not applicable, beneficial, feasible, or legal for the contractor, please explain.

5. Describe anticipated land-use changes.

Changes (i.e., agricultural to urban, etc.) that are projected based on past change or anticipated due to possible, proposed, or are currently "in the works" zoning changes should be addressed. Such changes might include: Land annexation, increasing urbanization, or the area's General Plan.

6. Cropping patterns.

Identify any crops that are grown on 5 percent or more of the contractor's irrigated acreage and provide the total number of acres for each of those crops. If there are a large number of crops grown on small acreage, combine them into one group, and list the combined acreage on the MISC. (<5 percent) line in the table. Specifying this information for the specified years provides a reader with a perspective on how the contractor's mix of crops is changing. Use crop list provided in Attachment C of the Plan Format.

7. Major irrigation methods.

List the five major irrigation methods used on most acreage within the district for each of the specified years. Select from attached list (Attachment C). Combine the acreage of the other irrigation methods into one group and list the combined acreage on the "All Other" line in the table. Specifying this information for the specified years provides the reader with a perspective on how the contractor's mix of irrigation methods is changing. Identify the irrigation methods as

listed in Attachment C of the Plan Format.

B. Location and Facilities

1. 2001 Agricultural Conveyance System

Describe the location (commonly used name also labeled on the district map), type of measurement device (flume, weir, propeller, acoustic, venturi, magnetic), and accuracy for each incoming flow to the district delivery system. Enter the length (i.e., 1.2 miles) of unlined and lined canals and laterals, of pipe, and of other types of distribution facilities (such as natural channels). There are 5,280 feet in a mile.

2. 2001 Urban Distribution System

Enter the length (i.e., 1.2 miles) of steel, cast iron, and asbestos concrete pipe in the distribution system. Combine the total length of other types of pipes (i.e., plastic) in the “Other” category.

3. List storage facilities.

Provide a list of contractor storage facilities that include capacity and location. A detailed descriptive map that contains this information will generally be the clearest way to describe the water system. The map should delineate whether the distribution lines are pipelines, lined or unlined canals or other, and the location of measuring devices, pumping stations, regulating reservoirs, etc.

4. Describe agricultural spill recovery system.

Agricultural water providers should describe the contractor’s spill recovery system-how and where distribution system spill water is collected and where it is re-used.

5. Describe delivery system operation.

Describe how customers schedule water deliveries with the district. Identify whether the delivery system provides water.

- a. On demand (i.e., customer may draw water at any time without notice).
- b. On request from the customer (i.e., customer requests start time, flow rate and quantity).

- c. On a rotation basis (i.e., each customer gets water every 10 days).
- d. Or some combination of methods.

6. Describe restrictions on the contractor's water source(s).

If the contractor's water supplies are constrained in some manner that limits contractor water management and operations, explain. A constraint might be a contractual limitation, a physical limitation, or some other limitation. Constraints might limit the amount of water or time of use. Agricultural water suppliers should include information about what operational constraints the system imposes on water management. Examples of operational constraints include receiving uncontrolled surface drainage from an upslope district with no control over quantity or timing and the inability to supply the quantity of water needed by the growers due to insufficient canal capacity, etc. If the contractor does not have sufficient supply to meet customer demand, discuss how this shortage developed.

7. Describe proposed changes or additions to contractor's facilities and operations for the next 5 years.

Examples of changes include changes to service area, lining/piping of existing canals, etc.

C. Topography and Soils

1. Describe topography of the district.

Describe the topography (e.g., hilly, flat, sloping to a watercourse) of the district. Discuss any impact of topography on contractor's water management. An example of a topography impact would be if lower sections of a gravity piped water distribution system have excessive pressure while upper portions of the system have inadequate pressure for pressurized irrigation systems. Topography also affects drainage capture and reuse.

2. Describe district's soils associations.

Provide district's soil associations (contact U. S. Department of Agriculture's Natural Resource Conservation Service (NRCS) for information) at <http://www.nrcs.usda.gov/>. An NRCS general soils map of the contractor service area will generally be the clearest way to present soils information.

Where can soil classification information be obtained?

The NRCS (formally the Soil Conservation Service) has soil survey information for most agricultural regions in California. Recent surveys (within the last 25 years) contain a single map called the "General Soil Map." These generalized soil maps group soils into what are called soil associations and are appropriate for this Plan. These soil groupings are made according to soil characteristic similarities, such as texture, depth, salinity, slope, flooding potential, impervious layers, etc. An awareness of these soil groupings can help target BMP programs, such as in areas where distribution canals might have high seepage rates or in areas of tailwater quality problems. Reclamation's soil classification system is based on projected economic return from different classes of soils and is not useful in developing BMP programs. Reclamation's soil classification system is not appropriate for this Plan.

D. Climate

1. Describe the general climate of the district.

Describe the general climate of the district (available from the National Weather Service, etc.). Local newspapers or weather service companies generally can also provide a concise description of local weather patterns. For weather data, specify the period of record (30 years recommended) and reference used. Historic weather data from the National Weather Service climatological stations provide all the requested data. Identify which station you selected for the contractor service area and how many years of records were available. The web site address is: www.wrcc.sage.dri.edu.

2. Average wind velocity.

3. Predominant wind direction.

4. Average annual frost-free days.

If the above information is not available, please enter not available.

5. Impact of any microclimates on water management within the district.

Where appropriate, relate climate to water use. Are there special microclimates in the district that require more (or less) water than other microclimates? The impact of climate may be similar to the impact of soil and terrain.

E. Natural and Cultural Resources

1. Provide the name of the natural resources area within the district.

Provide the name of the natural resource area, its size in acres, and a description. Examples of natural resources are wetlands, vernal pools, streams, wildlife refuges, and other areas.

2. Describe management of these resources in the past or present by the district.

If the contractor provides water to the natural resource areas or manages them, please describe the contractor's role. Contractor staff probably already work with the U.S. Fish and Wildlife Service, NRCS, U.S. Army Corps of Engineers, and the California Department of Fish and Game to identify natural resource areas and threatened and endangered species in the district.

3. Provide the name of the recreational and/or cultural resources area.

Provide the name(s) of the recreational and/or cultural resource areas, size in acres, and descriptions. Examples of recreational resources are sites used for rafting, water skiing, and fishing. Examples of cultural resources are archaeological and historical sites.

F. Operating Rules and Regulations

1. Attach a copy of the contractor's operating rules and regulations.

Note: If the contractor supplies no agricultural water, write "No Ag" in 2 through 5 below and skip to Section G.

2. Describe the contractor's agricultural water allocation policy.

Describe the contractor's agricultural water allocation policy. Attach the relevant contractor regulations as an appendix to the Plan or list the appropriate page number in this section.

3. Describe official and actual lead times necessary for water orders and shut-off.

Provide a description of the flexibility provided to farmers by attaching the relevant contractor regulations as an appendix to the Plan or site the appropriate page number in this section. Describe any differences between actual operations and the official rules, such as water delivery orders being filled in 12 hours when the rules say 24 hours is the minimum. More flexibility to farmers generally leads to less wasted water.

4. Describe the contractor's policies regarding surface and subsurface drainage from farms.

Attach the relevant contractor regulations as an appendix to the Plan or list the appropriate page number in this section.

5. Describe the contractor's policies on water transfers by the contractor and its customers.

Attach the relevant contractor regulations as an appendix to the Plan or list the appropriate page number in this section.

G. Water Measurement, Pricing, and Billing

Accurate water delivery measurement is an effective water management tool because both the water user and the contractor are aware of quantity, timing, and location of water use. Details on measurement device level of accuracy, frequency of calibration and/or maintenance, and reading schedule shows the contractor's commitment to effective water management.

Agricultural Customers

- 1. Provide total number of customers.*
- 2. Provide total number of 100 percent measured customers.*
- 3. Provide total number of customer turnouts.*
- 4. Provide total number of measured turnouts.*
- 5. Provide percentage of water delivered that was measured at customer turnouts.*
- 6. Complete measurement device table.*

A turnout is a water delivery point. Customers may have multiple water delivery points. All turnouts have some method of controlling water flow, but measured turnouts are those which can accurately measure the quantity of water delivered.

Provide the number of each type of measurement device used by the contractor and maintenance schedule.

The accuracy of the contractor's measurement devices was probably determined during installation, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the contractor has determined necessary. (See Appendix B for Calibration and Maintenance of Measurement Devices.) If the contractor only performs

maintenance when there is an indication of malfunction, write in “as needed.”

Urban Customers

- 1. Provide total number of customers.*
- 2. Provide total number of 100 percent measured customers.*
- 3. Provide total number of connections.*
- 4. Provide total number of measured connections.*
- 5. Provide percentage of potable water supplied in 2001 that was measured when delivered to a customer.*
- 6. Complete measurement device table.*

A connection is a water delivery point. Customers may have multiple connections. All connections have valves to control water flow, but measured connections also have meters. Provide the number of each size and type of meter used by the contractor and maintenance schedule.

The accuracy of the contractor’s meters has been determined by the manufacturer, but periodic calibration is necessary to maintain accuracy. For the various devices, provide the maintenance interval that the contractor has determined necessary. If the contractor only performs maintenance when there is an indication of malfunction, write in “as needed.”

Agricultural and Urban Customers

- 1. Describe the contractor’s current year agriculture water charges.*

Describe the contractor's current year urban or agricultural water charges, including dollar amounts for stand-by and quantity charges. Describe the rate structure for water deliveries that are billed by quantity (e.g., declining, uniform, or increasing block).

Attach the contractor’s rate ordinance as an appendix to the Plan or list the appropriate page number in this section.

- 2. Describe the contractor’s water-use data accounting procedures.*

Describe the contractor's water-use data accounting procedures, including how records are kept

and archived, availability of water-use data to customers, and how many years of customer water-use records are available. Attach copies of current year bills that were provided to each customer type (i.e., agricultural, urban, etc.). Record management systems include ledgers, card files, standard computer software, and contractor-specific software. Describe the system and provide examples, if appropriate. The description of the accounting procedures should document how easily customers may access their water-use history and how many years of historic data are available to them. Attach an example of an actual bill for each customer category and discuss how easy the bills are to understand and how they provide customers with current water-use data, comparative yearly-use data, and pricing signals.

H. Water Shortage Allocation Policies

1. Attach the contractor's current year water shortage policies.

Include how reduced water supplies and hardship water would be allocated. If the contractor has different policies for multiple customer types (i.e., agricultural or urban), provide a copy of each policy.

All water-related operating rules and regulations should be attached to the Plan. Attach the relevant contractor regulations as an appendix to the Plan or list the appropriate page number in this section. Reclamation requires that contractors with contracts that deliver more than 2,000 AF of water, have a water shortage contingency plan. For urban Plan development, assistance is available from DWR at <http://www.owue.water.ca.gov/urbanplan> and from Reclamation at www.usbr.gov/mp/watershare/.

2. Attach the contractor's current year policies that address wasteful use of water.

Address wasteful use of water. Include information on enforcement methods. Attach the relevant contractor regulations as an appendix to the Plan or list the appropriate page number in this section.

Section 2: Inventory of Water Resources

Note: If the requested information is not available, describe how that information will be obtained for the next Plan revision or state that the information is historical and cannot be reconstructed.

Information developed in this section will allow you to calculate a water inventory. A water inventory is a simplified water balance, quantifying how much water comes into the district, how that water is used within the district, and how much water leaves the district. Data entered should be for the year given at the beginning of this Plan (within the last 2 years).

A. Surface Water Supply

1. Acre-foot amounts of surface water delivered to the contractor by each of the contractor's sources.

In Table 1 of the Water Accounting Tables, quantify all contractor surface water supplies. Specify the amount and type of water (i.e., urban, agricultural, class II, spill, etc.) delivered to the district by month - enter the requested information in Table 1. If you do not receive State water, local surface water, or other surface water then those columns will be blank. Amount of water received under each right and/or contract for the last 10 years. In Table 8, quantify the amount of each type of surface water the contractor actually received in each of the last 10 years. If the contractor has sources of surface water that are not listed in the table, add the necessary columns.

B. Ground Water Supply

1. Acre-foot amounts of ground water pumped and delivered by the contractor.

Quantify contractor ground-water supplies in Table 2. Specify the monthly amount of ground-water pumped by the contractor. The “Pumped by Customers” column asks only for an estimate of private yearly ground-water pumping. If the contractor and/or private parties do not pump ground water, these columns will be blank.

2. Ground-water basin(s) that underlie the district.

Information necessary to describe ground-water basins can be found in California, DWR Bulletin 118-80, which identifies ground-water basins in California. Bulletin 118-80 describes the general boundaries of each basin and indicates if there is evidence of overdraft. You can use this Bulletin to identify the basin or basins that underlie your boundaries and their size, usable

capacity, and safe yield. Large ground-water basins underlie several districts. In a few cases, districts overlie more than one ground-water basin.

3. Contractor operated wells and managed ground-water recharge areas.

The Plan should provide a map of the district and the extent of the ground-water basin(s) within the district boundaries. Indicate on the map the location of district ground-water wells and any managed ground-water recharge areas.

4. If there is conjunctive use of surface and ground water, describe it.

Information necessary to adequately describe ground water conjunctive use programs includes:

- a. Determination of the ground water quality (i.e., is the ground-water quality adequate for direct use or is blending possible?).
- b. The amount of ground-water storage capacity currently available and how much additional storage could be available by extracting ground water for use.
- c. The location of existing and potential recharge sites (spreading basins, instream, or injection wells) and identification of the soil types and recharge rates.
- d. Determination of hydraulic continuity between the possible recharge and extraction areas.
- e. Identification of possible sources of recharge water and the quantities, qualities, and time of availability from each source.
- f. For districts without district-owned wells, describe how the district will receive compensation from the beneficiaries of the ground-water recharge.

5. For managed ground-water basins, attach a copy of the management plan.

If the contractor or its customers use ground water from a managed or adjudicated ground-water basin, attach a copy of the Plan.

6. For participation in ground-water banking, attach a description of the banking plan.

If the contractor participates in ground-water banking, insert here or indicate where attached, a description or table indicating how much and when water was banked, and how much and when it is available for retrieval.

C. Other Water Supplies

Acre-foot amounts of “Other” water used as part of the contractor’s water supply.

All surface and ground-water supplies should be identified and quantified in Tables 1 and 2. For instance, a long-term water transfer agreement or water only available while a reservoir is spilling should be listed as part of the year’s water supply. Quantify “Other” water supplies in Table 1.

D. Source Water Quality Monitoring Practices

1. Water quality problems.

Describe any surface water or ground-water quality problems and how the quality problems limit the use of the water or affect customer water-use decisions.

2. Urban contractors.

Attach the current year Customer Water Quality Report that is mailed to all customers. This report provides information on the quality of each of the contractor’s water sources. If there are water quality concerns and/or problems, describe how they affect the contractor’s water treatment process and its customers

3. Agricultural contractors.

If you have concerns with surface or ground-water quality, complete the following:

Concerns Yes _____ No _____

Indicate if the contractor has any surface or ground-water quality issues that affect customer-use decisions.

If there are water quality concerns and/or problems, describe the quality problems and how they affect the water’s use.

4. Current year water quality monitoring programs for ground water.

If there are water quality concerns and/or problems, identify which agencies conduct the Water Quality Testing Program, and for each constituent, identify the:

- a. Analyses performed.

- b. Frequency range.
- c. Concentration range and average.

5. *Agricultural contractors current year total dissolved solids (TDS) range for surface water and ground water.*

Surface water: _____ ppm

Ground water: _____ ppm

If there are water quality issues, enter the TDS content by source. This is requested due to its impact on the leaching requirement. Describe how the contractor's customers are notified of changes in the quality of water they are receiving from the contractor, i.e., when delivered water TDS is above normal for your system.

Surface and/or ground-water quality data may be available from Reclamation, DWR, or other agencies.

If there are no water quality issues, enter N/A.

E. Water Uses within the District

1. Agricultural

In Table 5, list the crops grown (use the crop list provided in Attachment C of the Plan Format) in the district. Enter the most common irrigation method for each crop, use the irrigation methods listed in Attachment C of the Plan Format. For each crop, list the irrigated acres of the crop, crop ET, leaching requirement, water used for cultural practices (frost protection, pre-irrigation, etc.), and effective precipitation. Table 5 will combine these values to determine the total water demand in acre-feet/yard (AF/Y) of each crop. You may wish to combine crops grown on less than 5 percent of the total irrigated acreage. To combine crops, determine an average crop ET, leaching and cultural requirement, and effective precipitation for this group of small acreage crops. The crop ET for crops in your area can be found in DWR California CIMIS Database, Cal Poly Irrigation and Training Research Center (ITRC) and Center for Irrigation Technology (CIT) Bulletin 113-3 (April 1975) or obtained from the DWR district office or the local farm advisor. The UCCE can also provide information on crop ET and water used for leaching and cultural practices. Effective precipitation by crop must be determined locally or you may contact Reclamation for assistance. Write a short narrative here for any use of water other than that listed in Table 5.

The types of irrigation systems used on each crop can help the contractor to target customer assistance programs, workshops, and educational materials. When the contractor collects information for the yearly Reclamation Crop Report, it can request information on the number of

acres of different irrigation systems used on each crop. Expanding an existing report will minimize contractor and customer cost and paperwork.

2. *Urban*

Quantify the number of accounts and yearly water use for each of the following customer account types.

- a. Single-Family - A connection that serves a residence designed for one family or group.
- b. Multi-Family - A connection that serves two or more residential units.
- c. Commercial - A connection that serves business water customers that provide or distribute a product or service, such as hotels, restaurants, office buildings, commercial businesses, or other places of commerce.
- d. Industrial - A connection that serves business water customers that are primarily manufacturers or processors of materials as defined by the SIC code numbers 2000 through 3999. Industrial customer may also include other operations that use municipal water supplies, such as sand and gravel quarries and cement mixing facilities.
- e. Institutional - A connection that serves business water customers that are dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All facilities serving these functions are to be considered institutions regardless of ownership.
- f. Landscape Irrigation - A connection that serves an urban landscaped area.
- g. Wholesale - A connection that provides water to a retail water agency.
- h. Reclaimed - A connection that provides recycled urban waste water for specific uses.
- i. Other (specify).
- j. Unaccounted - a quantity of water that is treated but not sold, lost through leaks, breaks, slow meters, fire fighting, line flushing, etc.

3. *Urban Waste Water Collection and Treatment Systems serving the entire contractor's service area.*

Describe the waste water collection and treatment systems for the urban area you service. Include the level of treatment, quantity of water treated, and place of disposal of the treated

water. Water providers that do not provide waste water treatment services must request this information from the waste water agency.

- a. Waste treatment plant - Provide the name of the waste water plants that treat urban waste water your agency delivered.
- b. Treatment level (1, 2, 3) - If there are different treatment streams, quantify the AF treated to each level during the report year.
- c. AF/Y - Quantify the quantity of water treated in the designated year.
- d. Discharged to - Identify where the treated waste water is discharged (i.e., ocean, river, percolation ponds, etc.).
- e. Total discharged to ocean/saline sink - Quantify the AF discharged to these areas during the report year.

4. Urban recycled waste water.

If treated water is recycled, describe the quantity of water recycled and how the recycled water is used.

- a. Treatment plant - Provide the name of the waste water plants that produce water for reuse.
- b. Treatment level (2, 3) - Quantify the AF treated to each level during the report year.
- c. AF/Y - Quantify the quantity of water treated in the designated year.
- d. Types of users - Identify the recycled water uses (i.e., landscape, toilet/urinal flushing, fountains and ponds, agriculture, etc.).

5. Ground-water recharge/management/banking.

Contractor operated ground-water recharge areas (as identified in Section 2 - B).
List the quantity of water used for planned and incidental ground-water recharge, including method of recharge.

Make a table showing how much water, where, when, and how water will be recharged.

Example:

Tab 6
Water Management Planner
Planning Guide, Section 2

Location	How	1999	2000	2001
Well #1	Well Injection	1000 AF	700 AF	0 AF
Res. #7	Percolation	500 AF	200 AF	500 AF

A ground-water recharge program uses imported water to place water into a ground-water basin for later withdrawal or provides surface water to farmers that normally pump ground water (in lieu of recharge) so that the ground water is left in the ground. Do not include incidental recharge, such as canal seepage or deep percolation resulting from excess irrigation, unless data relating to the above points has been developed. Describe each recharge location with respect to soil type, method of recharge, percolation or injection rate, and hydraulic continuity with the extraction areas. Include the AF recharged in the designated year:

- a. Recharge area
- b. Method of recharge
- c. AF/Y

If you participate in a defined ground water banking system, describe it here or attach a description. You may insert your own tables if the information requested is included. In order to participate in a ground water system, water must be able to be withdrawn at a later date. Describe how water that was charged into the ground will be withdrawn later for the contractor's or customer's beneficial use.

6. *Transfers and Exchanges.*

Transfers into or out of the district.

Describe the source and quantity of water in any transfer, trade, exchange, reschedule to another year, purchase or sale, into or out of the district, and for what uses. Information on transfers and exchanges within the district is not requested. Transfers refer to water exchanges, sales, or other agreements that transfer or exchange water between water users, such as:

- a. Agriculture to urban
- b. Urban to agriculture
- c. Agriculture to agriculture
- d. Urban to urban

7. Wheeling or other transactions.

List wheeling or other transactions not covered above that involve water into or out of the district. Provide the following information for the designated year:

- a. From whom
- b. To whom
- c. AF/Y
- d. Use

8. Any other uses of water.

If there were other uses of water not covered above, describe them (e.g. water for hydroelectric power, water used to meet water quality objectives, emergencies, environmental deliveries, etc.) and the quantities involved.

F. Irrigation Drainage from the District

If a contractor has drain water, but does not have surface and/or subsurface drain water monitoring programs, the Plan should state how this information will be collected and monitored in the future. If the contractor has no surface or subsurface drain water, state “None” and leave this section blank.

1. Surface and subsurface drain/return flows.

Identify the drain that carries the return flows out of the district and specify where the drain’s flow is used or dumped. For example, if the contractor surface return flow is discharged into the Sacramento River, the Plan should state that irrigation runoff and operational spills are returned to the Sacramento River. In this case, specific downstream uses would be unknown.

If surface drain water leaves the contractor's service area and is reused, identify the general location and type of that reuse and AF/Y. If collected subsurface drain water leaves the contractor's service area and is reused, identify the general location, type of that reuse, and AF/Y. If surface and/or subsurface drain water is used within the district for agriculture, wildlife refuges, M&I, or other purposes, describe.

2. Drainage Water Quality Testing Program

Identify which agency tests the drainage water quality and include the information listed below:

- a. Analyses performed
- b. Concentration range
- c. Frequency range
- d. Average

3. Contractor's role in the current year drainage testing program.

If the contractor conducts, participates, or funds any part of the drainage testing program, please describe those activities.

4. Any usage limitation resulting from the drainage water quality.

Describe the constituents in the drain water (i.e., selenium, boron, etc.) and the resulting limitations on use. For instance, excessive nitrates would limit the use of drain water for domestic consumption but not for agricultural use. High salt concentrations may limit the use of drain water for agricultural use.

Contractors included in the drainage problem area, as identified in, A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), should also complete Attachment A.

G. Water Accounting (Inventory)

Develop a water budget for the contractor for the designated year (one of the past 2 years). If a contractor chooses, a representative water supply year can also be included. The intent of the water accounting is for contractors to quantify water supplies, uses, and losses within the district.

Knowledge of the amount of water used for various purposes can lead to improved water management. A water inventory also identifies where a contractor lacks information. When

analyzing BMPs, the water savings resulting from an individual practice can be estimated based on the water inventory. Completing Tables 1 through 8 satisfies all the water accounting data. If you have completed Tables 1 through 8, skip to the next section.

1. Quantify contractors water supplies.

To complete this section, enter the necessary data in the listed tables below.

- a. Surface water supplies, imported and originating within the district, by month (Table 1, completed in Section 2, A).

Quantifying surface supplies by month will allow contractors to show what supplies are used to meet water demands, and what supplies are used for ground-water recharge. (Include water transferred to the contractor in “Other Water” in Table 1.)

- b. Ground water extracted by the contractor, by month (Table 2, completed in Section 2, B).

- c. Effective precipitation by crop (Table 5).

The contractor will have to calculate this information based on when the crop was planted, the soil moisture profile and precipitation patterns and intensity. Information is available from ITRC and CIT. DWR district staff or local farm advisors may also have information on the effective precipitation amounts for the crops grown in your district.

- d. Estimated annual ground water extracted by non-contractor parties (if records are not available, provide an estimate and basis for estimation) (Table 2, completed in Section 2 B).

Urban water wells are usually metered, and the information is generally available by contacting the pumpers. If the contractor does not have ground-water production records for private agricultural ground-water pumpers, use the following method to estimate the quantity pumped:

$(\text{water needed for crop ET}) + (\text{water needed for leaching}) - (\text{effective precipitation}) * (\text{crop water need})$

$(\text{crop water need}) / (\text{irrigation efficiency}) * (\text{estimate of applied water})$

$(\text{estimate of applied water}) - (\text{amount of water delivered by the contractor}) * (\text{estimated amount of private ground water pumped})$

A similar method can be used to estimate the private urban pumping.

e. Recycled water, by month (water originating from a municipal waste water treatment plant) (Table 3, completed in Section 2, E, 2).

Recycled water is treated urban waste water that is treated and available for reuse.

f. Other supplies, by month (Table 3).

To be defined by the contractor.

2. *Quantify water used.*

To complete this section, enter the necessary data in the listed tables.

a. Conveyance losses, including seepage, evaporation, and operational spills from canals; and leaks, breaks, fire, and flushing from pipes (Table 4).

Types of canal losses include seepage, evaporation, and operational spills. Losses from piped urban distribution systems results from leaks, breaks, flushing, and fire fighting.

Canal seepage is the most difficult to calculate. Seepage from unlined canals varies as soil characteristics change and the rate of loss per section requires ponding tests, good metering or some other technique. Canal evaporation can be calculated by determining the surface area of the canals and regulating reservoirs and applying the local evaporation rate. Operational spills can usually be calculated since the end of a canal is generally a weir or other structure that could be calibrated. Describe how the values were determined or estimated.

Conveyance seepage is considered a loss of irrigation water, and sometimes, ground-water recharge. For example, when the Friant Unit's class II water is available, conveyance seepage in some cases may be considered a ground-water recharge method. However, when contract water is conveyed, seepage often results in loss of water intended for irrigation, increasing pumping costs and degrading water quality. Practices that reduce seepage can help contractors use water more efficiently, but may require new methods and locations for ground-water recharge.

Losses from urban distribution systems can be calculated by conducting a system water audit. The AWWA Water Audit Manual has complete instructions, worksheets, and examples.

b. Consumptive use by riparian vegetation (Table 6).

Estimate the annual consumptive water use by riparian vegetation inadvertently or intentionally provided with contractor water. Do not include riparian vegetation located at an environmental

or recreational resource. Estimate the total acres of riparian vegetation and an overall use (based on ET during the months when water is available) to obtain an estimate of consumptive use. Information may also be available from local farm advisors and neighboring contractors.

c. Applied irrigation water, crop ET, water used for leaching and cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5).

This section quantifies crop water need. Crop water need includes crop ET and water used for leaching/cultural practices. Determine the total crop water need for each crop.

ET requirements for different crops in different climates can be found in DWR Bulletin 113-3 (April 1975), Oregon State University Miscellaneous Publication 8530 (1992) and Nevada Department of Conservation and Natural Resources, Division of Water Planning, Miscellaneous Publications. Information is available from ITRC and CIT. DWR district staff or local farm advisors may also have information.

d. Urban water use.

Determine total water sales and other authorized uses. Do not include losses, fire fighting, and system flushing as these were included in Table 4, Distribution System Losses.

e. Ground-water recharge (Table 6).

Quantify water used by the contractor for the purposeful recharge of ground water, including recharge ponds and water injected for ground-water recharge.

f. Water exchanges and transfers (Table 6).

Quantify inter-district water transfers.

g. Estimated deep percolation within the district (Table 7).

Deep percolation is usually estimated as the difference between applied water (minus any runoff leaving the district) and crop water use. Some deep percolation may be necessary for leaching. Excess deep percolation is considered an economic loss since ground-water quality is degraded and energy is used for unnecessary pumping. Water applied for intentional recharge is not deep percolation. Calculate, or if necessary, estimate the designated year's deep percolation.

h. Flows to perched water table or saline sink (Table 7).

Calculate, or if necessary, estimate the amount of deep percolation or drainage that flows to a saline sink or to a perched water table (within 5 feet of the soil surface).

- i. Total urban waste water treated and discharged (Table 7).

Quantify the treated municipal waste water that is discharged to the ocean or a saline sink.

- j. Irrigation spill or drain water leaving the district (Table 6).

Calculate, or if necessary, estimate the total return flows (surface runoff) leaving the district.

- k. Other (Table 6).

Quantify any other uses of water within the district.

3. Overall water budget.

Compare total water estimated to be available for sale within the district with the total water actually sold by the district (Table 6).

Table 6 compares total water estimated to be available for sale with total water sold. This water budget usually identifies areas where water management could be improved and thus helps the contractor to select and implement appropriate BMPs. Evaluation of the BMPs in Sections 3 and 4 requires an estimate of how much water may be conserved by each practice. Parts of this process are imprecise. For example, estimating water savings from education programs is very difficult. However, this process will help the contractor to estimate the amount of potential water savings and the costs of achieving those savings.

Section 3: BMPs for Agricultural Contractors

In this section, describe the water management program the contractor determines will best

Note: Now annual reporting can be submitted over the internet at www.usbr.gov/mp/watershare/.

accomplish each BMP. The success of some of the practices will depend on cooperative work with other entities. Monitoring and updating will allow the contractor to modify planned programs that do not accomplish the practice as designed.

Some BMPs are considered universally applicable (critical) and others are considered “generally applicable” (exemptible). Under certain circumstances, one or more of the exemptible BMPs may not be appropriate for contractor implementation. The contractor will implement each exemptible BMP, unless the contractor provides adequate documentation that supports an exemption or states the reason the BMP is not applicable in accordance with Attachment B.

Wholesalers must insure that their subcontractor’s have an adequate Plan found to meet the Criteria. Wholesalers may include subcontractors in a single Plan or require each retailer to prepare separate Plans. If retailers prepare their own Plan, the wholesaler should be involved to

Note: If the requested information is not available, describe how that information will be obtained for the next Plan revision or state that the information is historical and cannot be reconstructed.

the extent necessary to insure it is found to meet the Criteria.

For each BMP, describe how the plan will be carried out, including actions and timelines, budgets, staff, and projected results (e.g., changes in water and energy use, chemical inputs, improved yields, increased habitat) projected for at least 3 years. Identify how each practice will be monitored to see if it is achieving the projected results.

A. Critical BMPs for Agricultural Contractors

Critical BMPs are those that every Reclamation agricultural contractor is expected to implement. These BMPs are considered to be the basic elements of good water management. Select a program design for each BMP that will provide maximum benefit to the contractor and its customers.

1. Water measurement.

Measure the volume of water delivered by the contractor to each customer with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent. Three categories of measurement devices that may meet this criterion are devices with totalizers, standard flow measurement devices, and non-standard but calibrated devices.

The **first category** includes devices with totalizers that measure volume: Propeller meters, Venturi meters, magnetic meters, and acoustic meters. These have a high level of accuracy with proper installation and periodic maintenance and calibration.

The **second category** includes standard flow measurement devices that measure flow rate and also require accurate measurements of water level and delivery time to determine volumes: Replogle and Parshall flumes; rectangular, trapezoidal (Cipolletti), and V-Notch weirs; and canal meter gates. These devices require proper installation; continuous or sufficiently frequent recording of water levels and flow rates; delivery beginning and ending times; adjustments for approach velocity in some cases; and regular maintenance and calibration for good accuracy.

The **third category** includes non-standard, calibrated flow measurement devices. This category includes special measurement devices developed by a district. Typically, there are no published standard dimensions or flow tables for such devices. Consistent dimensions and installations; accurate determination of delivery time; local calibration and a verification of accuracy, based on a representative sample number of devices measured over time; and a proposed schedule for maintenance and calibration would be necessary for acceptability. This category also includes calibrated pumps when the suction side water level fluctuation is small when compared to the lift (+/- 6 percent) and the discharge pressure is not changed.

<i>Refer to Appendix B for examples of installation, calibration, and maintenance of measurement devices that are described here.</i>

Rough estimates of flow rate or volume, such as flow rate estimates at check structures, the sum of siphon tubes, or the use of occasional flow readings and multiplying by the time between readings (or other methods of measurement not specified here), are **NOT** acceptable since they do not provide a documented reasonable degree of accuracy.

Estimates of flow rate or volume based on one moment of time and assumed continuous over a period of more than an hour, are **NOT** acceptable. Flow rate estimates at check structures or the sum of siphon tubes (or other methods of measurement not specified here), are **NOT** acceptable since they do not provide a documented reasonable degree of accuracy.

- a. Provide total number of customer turnouts that are unmeasured or do not meet the standards listed above.
- b. Provide number of measurement devices installed last year.
- c. Provide number of measurement devices installed this year.
- d. Provide number of measurement devices to be installed next year.

Water measurement of each turnout has many benefits. When customers know how much water they use for incremental time periods (monthly, per irrigation, etc.), they are able to make informed economic decisions. The distribution system can be correctly sized and operated to provide the water quantities and timing that customers need. Contractor costs for pumping, canal maintenance, and drainage can be controlled. Measurement devices (meters, flumes, weirs, sonic, etc.) should be selected based on the characteristics of the contractor's distribution system, water quality, and delivery requirements. It is important to implement a maintenance and/or replacement program in conjunction with the installation program, because measurement devices become less accurate over time.

Contractors that measure deliveries can provide customers with their historic water delivery records. Customers can then determine what quantities of water were applied to crops in previous years and evaluate their irrigation systems and operations.

An example of a measurement program is the one implemented by the Laguna Irrigation District. The Laguna Irrigation District delivers water to 32,000 acres of agricultural land. In 1988, the contractor began a project to install propeller meters on all contractor delivery turnouts. The goal of the project was to ensure that all growers in the district received an equitable share of the available water. There was no method of measuring water deliveries prior to this program.

At the time, the Laguna Irrigation District implemented the metering program, it had over 500 turnouts. To reduce cost, the contractor purchased 180 portable propeller meters of various sizes. Contractor personnel installed these meters at delivery turnouts when a grower received water and read the meters daily during a water delivery.

This program allowed the contractor to change from a rigid delivery schedule to an arranged demand system, which features flexible flow rates and shut off times. The new system ensures the equal distribution of available water.

The Laguna Irrigation District reports that flexible deliveries allow growers to irrigate crops according to crop need, increasing irrigation efficiency, and reducing deep percolation. It also helps growers to more closely monitor water application and identify high-use fields. A comparison of deliveries in 1987 (before metering) and 1991 (after metering) indicates that

8 percent less water was used in 1991.

The Laguna Irrigation District purchased 180 meters, a computer and software database to compile the meter readings, a rack to store the meters, repair parts for the meters, and training for their personnel. They also hired a consulting agency to administer the program. Project cost was approximately \$260,000. The contractor customers are pleased with the metering system.

2. Designate a water conservation coordinator.

Provide the name, business phone number, business e-mail address, and business mailing address of a contractor staff person responsible for Plan development and implementation. For small districts, this could be a part-time responsibility. For larger districts, this may be a full-time responsibility with additional staff, as appropriate.

If a consultant is hired to write this Plan, the contractor should designate a conservation coordinator to manage the work and communicate with Reclamation.

Reclamation offers workshops to assist with Plan development and will provide technical assistance to the contractor during Plan preparation and implementation. When necessary, Reclamation area office staff will meet with a contractor's conservation coordinator to assist with the preparation, implementation, and evaluation of the Plan.

3. Provide or support the availability of water management services to water users.

Develop and conduct individual programs or cooperative programs with other contractors in regional programs. Some contractors may want to contract or arrange program delivery through consulting firms, cooperative extensions, or others. The services include, but are not limited to:

a. On-farm evaluations

1) On-farm irrigation and drainage system evaluations using a mobile lab type assessment.

Reclamation has developed guidelines for evaluating the adequacy of the on-farm irrigation system evaluation to assist contractors in the planning of this BMP. The Criteria states that contractors shall provide or support on-farm irrigation system evaluations for their customers.

The BMP is intended to provide the water users with access to irrigation system performance information that will help them to improve the management of their irrigation.

Water users may or may not take advantage of this service. The contractors are not required to offer these services free of charge. The following is considered an adequate program:

- a) Offer to contractor water users a rebate/discount of 25 percent off the fair market price of an evaluation.
- b) Annually provide this service to at least the first 5 percent of the contractor water users requesting this service.
- c) Actively advertise this service to contractor water users.

This can be accomplished by providing financial support to mobile lab programs, consultants, university students, or others who can perform the evaluations. The contractor shall also make all contractor water users aware of the service through newsletters, bill stuffers, or other contractor publications. If the contractor can demonstrate that at least 5 percent of contractor customers currently have their systems evaluations annually, the contractor does not have to provide the service. The contractor will still be expected to maintain support for this service by providing information to contractor customers.

On-farm irrigation system evaluations provide information that growers need to make efficiency improvements to existing irrigation systems. Irrigation evaluations, such as those being provided by mobile labs and other consulting services, identify correctable problems such as worn nozzles, insufficient filtration, incorrect or irregular nozzle sizes, excessive run time, etc. Also, evaluations often identify when and where over- or under-irrigation are occurring.

In the Plan provide information on the number of farms and acres that are projected to receive irrigation system evaluations each of the next 3 years. Include:

- a) Total number of irrigated acres.
- b) Number of irrigated acres to be surveyed per year by on-farm irrigation evaluations.
- c) Total number of farms.
- d) Number of farms to be surveyed per year by on-farm irrigation and drainage evaluations.

For those contractors with irrigation specialists on staff, on-farm evaluations could

be part of the contractor's overall program, thus supplementing the efforts of other services or mobile labs. The California Mobile Lab Program, with more than 20 contractors participating, has evaluated more than 2,000 fields since 1981 (about 1 percent of the total). Agricultural consultants may also be able to perform this service for contractor customers. Information on existing mobile labs can be obtained from DWR. If a mobile lab is not located in the local area, DWR can provide information on starting one.

2. Timely field and crop-specific water use information to the water user.

There are several substantial benefits of accounting for water deliveries by crop and field. A water user having knowledge of the deliveries has real-time information on their individual irrigation events and the total of all irrigation on each field throughout the season. Comparison of per acre water usage of each crop by field within the district provides very meaningful water use information both to the water user and the contractor. Crop-specific and field-specific data allows development of a tiered water pricing system that is sensitive to crop type. It also provides accurate data for measuring the results of BMPs.

So that water users can compare their crops' specific water use with others within the district, the contractor can prepare an annual report that summarizes water use by crop and by field, computes the unit water use per acre, and sorts these data in several ways-by water user, field number, crop type, and unit water use. At the end of each year, these reports can either be mailed to contractor customers or posted at the contractor office.

These reports will also be the best source of information to identify anomalies in water use that are indicators of possible sources of excessive tailwater and deep percolation or inaccurate metering.

b. Normal year and real-time irrigation scheduling and crop ET information (i.e., CIMIS).

Describe the contractor's irrigation scheduling assistance program, including methods of data dissemination, and list any cooperating agencies.

To assist growers to develop crop irrigation schedules, contractors can establish programs to:

1) Measure and collect the necessary climatological parameters (temperature, relative humidity, wind velocities, solar radiation, and precipitation) to make proper ET rate calculations (in both real-time or current and normal situations).

2) Disseminate the data to interested contractor customers.

- 3) Provide technical assistance and instruction on scheduling techniques.

Climatological data for crop ET calculations and irrigation scheduling can be collected through various means. DWR has utilized the following types of climate stations to accomplish this task:

- 1) An evaporation pan station modeled after standard U. S. Weather Bureau stations.
- 2) Computerized stations of CIMIS.

For an evaporation pan station, detailed discussions on the minimum standards for installation and application of the data in determining crop ET can be found in the California DWR Bulletins 113-3 and 113-4. Information is available from ITRC and CIT. DWR district staff or local farm advisors may also have information. Contractors will have to establish a program to disseminate the data collected at these stations (newspapers, television, radio, telephone, e-mail, newsletter, etc.).

The CIMIS project uses computer and telecommunication technologies to collect and disseminate climatological data to contractors, growers, irrigators, and others on a daily basis. Climatological data is measured and collected constantly by a network of computerized climate stations. The data is transmitted to and stored in a centralized computer and is accessible to all interested parties within 24 hours. Hardware and software requirements to receive this data include a personal compute, a telephone modem, and communications software.

Historical climatological data can be used to develop normal year crop ET rates which can assist:

- 1) Contractors to determine approximate quantities of water that may be requested during any particular growing season.
- 2) Growers to estimate the growing season ET requirements of crops.

DWR Bulletin 113-3 also provides normal year ET rates, adjusted for effective precipitation, for selected crops.

For assistance in developing training workshops and seminars in irrigation scheduling, contractors can contact local offices of the UCCE Farm Advisors (see Appendix C). The consultants are also available to assist in the development of training courses or to provide direct technical assistance.

- c. Surface, ground, and drainage water quantity and quality data.

Describe the contractor's surface, ground, and drainage water quality monitoring program; including methods of data dissemination and list any cooperating agencies.

If the contractor has water sources with a range of qualities that affects how much water is needed for leaching, providing water quality information when sources change can assist customers to use an appropriate amount of water. When the quality of delivered water changes, contractors should inform customers so that they can make appropriate irrigation adjustments (for leaching, etc.). Workshops can be designed to assist growers to make the best use of this information.

- d. Agricultural water management educational programs and materials for farmers, staff, and public (soil moisture and salinity monitoring; in-school awareness programs; Agwater software; efficient irrigation techniques, crop water budget, and other approaches; program delivery via workshops, seminars, newsletters, field days, and demonstrations, etc.).

Describe the contractor proposed or supported educational programs and their goals. Attach the materials used in these programs.

The contractor should either sponsor or conduct educational seminars/workshops for contractor farmers and staff. Examples of workshop topics include: Information on weather, crop ET, soil moisture holding capacity, crop characteristics, irrigation scheduling, and water-use planning. Input from customers, consultants, irrigators, and other technical experts will be important when determining the content of these seminars/workshops.

Educational seminars/workshops can serve contractors in several ways. They can be used to:

- 1) Communicate the importance of implementing conservation programs.
- 2) Describe conservation procedures that can be utilized by customers.
- 3) Provide a forum for growers, industrial users, and others to exchange ideas and experiences. These meetings also provide contractors an opportunity to exchange ideas.

Information included in the Plan should include:

- 1) Program
- 2) Co-funders (if any)
- 3) Yearly targets

Various local, State, and Federal agencies such as the U. S. Department of Agriculture's Agricultural Research Service, the UCCE, and resource conservation districts offer technical assistance and will work with the contractor to provide educational seminars and workshops to water users.

4. Pricing structure.

Adopt a water pricing structure for contractor water users based at least in part on quantity delivered.

Describe the proposed quantity-based water pricing structure and when it will become effective. Financial variables influence the way customers use water. For example, when agricultural customers pay for each AF of water received, they are more likely to order an amount closer to the actual crop water need. Ordering only what is needed can improve distribution system capacity, reduce tailwater, and increase supply reliability. Experience shows that urban customers reduce water use by 20 percent or more when charges are based on quantity used. This can result in substantial cost savings for potable and waste water treatment costs.

5. Evaluate the need, if any, for changes in policies of the institutions to which the contractor is subject.

Identify changes to the rules and regulations of the contractor's water suppliers that would allow for more efficient water use and operations. Water projects (CVP, SWP, etc.) and wholesale water agencies provide water based on policies that sometimes make retail water management more difficult. For instance, policies that require payment for unused entitlement, or that restrict carry-over of unused water, can encourage unnecessary water use. Identify any policies that reduce the contractor's ability to improve water management and provide suggestions for improvements.

As an example, Westlands Water District, through negotiations with Reclamation, was able to change their water year so that the end of the water year could coincide with the end of the rainy season. Now Westlands Water District's customers are better able to manage their water supplies to take advantage of effective precipitation.

6. Evaluate and improve efficiencies of contractor's pumps.

Describe the pump efficiency evaluation program and the role of the contractor and participating local utilities in the program.

Many contractors operate booster pumps or ground-water pumps as part of their delivery

facilities. A program to evaluate and improve the efficiencies of such pumps may result in energy savings, peak load reductions, or reveal capacity limitations due to inefficient facilities. Over the long term, the contractor may be able to reduce operational costs and improve operational efficiency.

Provide information in the Plan on the contractor's pump testing program. Both Pacific Gas and Electric and Southern-California Edison have pump-testing programs that can assist contractors to minimize power costs.

B. Exemptible BMPs for Agricultural Contractors

Agricultural contractors should implement the following BMPs unless the contractor demonstrates that the practice is not appropriate. Some contractors may spend time studying the most effective way to implement a BMP or conduct a pilot study to determine if a BMP is appropriate for that contractor. For appropriate BMPs, provide a description of the implementation plan and include time schedules, budgets, and monitoring plans. If a BMP is to be studied, or a pilot study conducted, provide details and schedules of the study. These studies must be completed expeditiously and before the next Plan revision. The contractor should follow the exemption criteria (see Section 6) to justify exemptions and document the exemption in this section. Some Exemptible BMPs may not apply to the contractor. See Attachment B for examples of circumstances under which Exemptible BMPs are not applicable.

The purpose of preparing a Plan is for the contractor to implement the programs developed during the planning process. Each year the contractors report on the previous year's actual BMP activities, budget, and staffing. They also report on expenditures and staffing levels for the coming projected year and provide information on planned activities.

Contractors should maintain regular records of BMP implementation activities to facilitate the completion of the annual update. The BMP records can be tracked in a variety of ways. Some methods are: Conservation staff recording data on their time sheets, week schedules, and special budget computer codes.

1. Facilitate alternative land use.

Facilitate alternative uses (voluntary, compensated) for lands with exceptionally high water duties or whose irrigation contributes to significant problems such as drainage.

This BMP applies only to contractors that have irrigated lands with the following characteristics:

- a. High water table (<5 feet)

- b. Poor drainage
- c. Ground water selenium concentration > 50 ppb
- d. Poor productivity

If a contractor does provide water to lands that have the above characteristics, describe the contractor's program that will promote a voluntary, compensated change of use for those lands.

The decision to retire land usually includes other factors, such as alternative land-use demand. Also, it may not preclude the option of re-establishing irrigated agriculture, if circumstances should change.

In Arizona, recreation-oriented uses have been proposed for agricultural lands retired due to salinity problems. In other areas, golf courses and shooting ranges have been proposed. Reclamation and DWR are interested in working with contractors to design such a program.

2. Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils.

The use of recycled urban waste water for agricultural irrigation provides an opportunity for reuse of an available water supply. Reuse of urban waste water can be an important element in overall water management.

Identify the source of recycled water and the yearly quantity that is available. Provide the cost of the recycled water and describe its quality in relation to the crops the water will irrigate. Describe the program that will promote the use of the recycled water by agricultural customers and identify the contractor's role in the program.

3. Facilitate the financing of capital improvements for on-farm irrigation systems.

Financial aid to farmers may include cataloging available funding sources and procedures and/or obtaining funding, administering the program, and providing low-interest loans.

Identify contractor programs to facilitate and/or provide financial incentives for improved on-farm water management. Include information on the estimated amount of yearly loans. Attach funding source information provided to water users.

Often a grower can greatly improve water management techniques, if financing is available. For some growers, the ability to implement efficient management practices and install modern irrigation systems is hampered by the lack of capital. These individuals are willing to improve efficiency, if long-term affordable financing is available.

Two examples of contractor-assisted customer financial assistance programs follow:

1. In 1992, the Broadview Water District established a low-interest loan program for their customers. It is a lease-to-own program where the customer takes out a loan to purchase equipment and supplies and owns the equipment after the loan is paid off. The customer approaches the contractor with an on-farm water conservation proposal (e.g., the installation of a new irrigation system). If the contractor approves the proposal, the customer selects the retail outlet that offers the lowest bid to provide the necessary supplies and equipment. If all aspects of the proposal are met, the contractor issues the loan to the grower.

The contractor pays 3.0 percent interest on the loan to a State agency and charges the customer 3.2 percent, which covers administrative costs. For a tax advantage, the contractor considers these transactions as a lease program rather than a straight low-interest loan.

The program is scheduled to run for 12 years; however, the contractor estimates that the program will be paid off within 5 years. During 1992, \$900,000 was used by customers to improve their irrigation equipment. The contractor requires that the customer and contractor names be stamped on the equipment purchased under this program. Also, the grower must have insurance on the equipment.

2. In 1989, the Central California Irrigation District implemented a conservation loan program for its customers. The kinds of projects financed by the program includes pipeline installations, concreting ditches, sprinklers and drip irrigation system installations, land leveling, tailwater return systems, and constructing community ditches. The contractor's Board encourages customers to participate in the program.

Customers have up to 5 years to repay the loans. The contractor adds an annual interest rate of 3 percent to cover its administrative costs associated with processing the loans. The maximum dollar amount for any individual farming entity or project is \$50,000. All loans are repaid with single annual payments, which are then reissued as new loans.

The funding for the program is surplus fees generated by the contractor's tiered water pricing schedule begun in 1989. Tiered pricing was implemented to encourage water conservation. However, several customers went into the second tier of pricing during that first year. Extra funds were generated and the contractor's Board decided to make \$635,000 available for the conservation loan program. Total funding for the loan program presently stands at \$1 million. When customers no longer wish to participate in the program, the funds will be used for other contractor conservation projects.

4. Incentive pricing.

Implement a pricing structure that promotes one or more of the following goals:

- a. Encouraging more efficient water use at the farm level.
- b. Supporting planned conjunctive use of ground water.
- c. Appropriate increasing of ground-water recharge.
- d. Reducing problem drainage.
- e. Improving management of environmental resources.

Describe the incentive pricing structures that were considered, which were selected for implementation, and when it will become effective.

Incentive pricing, such as increasing block rates, are those that encourage appropriate water use. Incentive rates encourage customers to accurately determine and apply only the water a crop needs, thus reducing over-irrigation and the resulting drainage.

Examples and explanations of agricultural rate schedules can be found in Reclamation's Incentive Pricing Handbook for Agricultural Water Districts, available from your Reclamation area office.

Several contractors have implemented incentive pricing structures for irrigation water and drainage water disposal. Because of area specific management needs (such as leaching requirements, potential supply shortages, crop types, and soil and climatological conditions), contractors' incentive rate designs will vary.

The Broadview Water District implemented an increasing block-rate pricing structure for agricultural in 1989. The purpose of the program was to motivate growers to improving their on-farm irrigation operations and reduce the quantity of drain water collected in the subsurface drainage system installed beneath two-thirds of the district.

The Broadview Water District's block-rate pricing structure is comprised of two components: Crop-specific tier levels (percolation depths which determine the price of water) and field-level accounting of water deliveries. The crop-specific levels are required because the volume of drain water generated from the applied water varies by crop according to the rate of crop ET. Crops with higher ET requirements are permitted to receive additional irrigation water applications before higher prices become effective. Without these concessions, growers could be limited in the kinds of crops to plant. Field-level accounting of water deliveries encourages the growers to carefully monitor and apply their irrigation supplies.

The pricing structures for the 1989 growing season were established at 90 percent of the district-wide average irrigation depths for 1986 through 1988 for all crops. This approach incorporates locally relevant crop water requirements, soil characteristics, and irrigation practices. The

10 percent reduction in applied water was previously determined to result in a 15 percent reduction in drain water volume. Other incentive pricing structures can be as effective as this example.

5a. Line or pipe ditches and canals.

Line or pipe distribution systems to increase distribution system flexibility and capacity and decrease maintenance and reduce seepage.

Seepage and evaporation losses in earthen ditches and canals can be minimized by replacement with pipelines or lining with bentonite clay, concrete or pour-in-place plastics/textile membranes. To reduce on-farm seepage losses, contractors may wish to consider helping growers to line their ditches or install pipelines.

An example of a contractor that utilizes a pipeline distribution system is the Westlands Water District, whose permanent distribution system consists of a buried pipeline network which conveys irrigation water from the main supply canals to 160- or 320-acre land units totaling more than 550,000 acres. The distribution system was built between 1965 and 1979 and serves approximately 90 percent of the irrigable land in the district. Most of the remaining district lands are served by farmer-constructed temporary diversions, which are maintained by the farmers.

The contractor's water supply is distributed through 1,034 miles of buried pipe, varying in diameter from 10 to 96 inches. Gravity and pumps feed 71 lateral pipelines.

In 1969, the Shasta View Irrigation District, located in the Klamath Falls area, converted from an unlined canal system to a piped water delivery system. A 65-year Rehabilitation and Betterment Act loan from Reclamation funded the \$3.2 million project.

Seventeen miles of buried pressure pipe replaced 21 miles of unlined canal, which eliminated eight small regulating reservoirs and 110 farm-pumping stations. With the canal system, the district had lost approximately 30 percent of its water through seepage from the unlined ditches and reservoirs. District losses are now less than 5 percent.

An additional benefit of the pipe system is the ability to deliver water to growers for frost protection. The elevation of the Klamath Basin is such that frost is a threat to the potatoes grown in the region. To protect against the affects of frost, growers sprinkle the potato fields to control air temperature. The open canal system could not deliver enough water to meet the demands for frost protection, but the new pipe system was designed to operate at full pressure during frost periods, assuring growers of sufficient water to protect the potato fields.

Describe the program to line or pipe the distribution system reaches with the greatest loss per foot or those which have the greatest negative impact on delivery flexibility and capacity.

As water cost or demands increase, it will become cost effective to line/pipe more sections of the distribution system. Lining or piping canals and laterals is an expensive program; therefore, consider lining or piping canals with the greatest seepage rates.

5b. Regulatory reservoirs.

Construct regulatory reservoirs to improve distribution system delivery flexibility. The construction and/or lining of regulatory reservoirs can provide improved distribution flexibility, improved system operation, additional supply storage, reduced operational losses, and increased flexibility in the reception of surface and/or aqueduct supplies.

The Imperial Irrigation District constructed six regulatory reservoirs as part of its program to improve the operation efficiency of its distribution system. Although the combined storage capacity of these reservoirs is only about 2,300 AF, some of the more significant benefits of the reservoirs include:

- a. Storing water normally held with less efficiency in the contractor's canals and laterals or released to the Salton Sea (when growers are unable to use ordered water due to unexpected rainfall).
- b. The ability to meet customer water delivery requests.
- c. Increased distribution system operational efficiency.

6. Increase flexibility (within operational limits in water ordering by, and delivery to, water users.

Modify distribution facilities and controls to increase the reliability, consistency, and flexibility of water deliveries.

Describe measures you plan to implement to: Change from a rotation to an on-demand delivery system, improve delivery flexibility, and improve delivery system capacity. Increase delivery flexibility to the farmer and describe obstacles for further flexibility improvements.

Describe measures you plan to implement to increase delivery flexibility available to farmers, and describe obstacles for further flexibility improvements.

Many factors affect the effectiveness of irrigation. Among these are soil texture and uniformity,

surface gradient, length of irrigation run, weed growth, debris from previous plant growth, irrigation water quality, root zone soil chemistry, depth of the unsaturated zone, wind velocity, humidity, air temperature, grower's expertise, and the design, condition, and operation of the irrigation system.

If all of the above factors are optimum, but the irrigation water is not available at the necessary time or in the appropriate quantities, irrigation effectiveness will be adversely affected. Weather unpredictability often does not allow a grower sufficient lead time to order water. Unlike urban water systems, agricultural districts often do not have systems that can provide water on demand.

The Broadview Water District at one time required a 48-hour notice for water orders and a 24-hour notice to end a water delivery. This was modified in 1990 to 2-hour notice in most cases to provide growers with more flexibility. Many growers now apply frequent, shallow irrigations instead of the deep, infrequent irrigations used prior to 1990. Growers have the ability to begin and end irrigations on short notice, often in the same day.

Increased flexibility allows growers to irrigate only when necessary, but growers must be sure that the water will be there when needed.

Provide a copy of a sample bill and water order.

7. Construct and operate contractor spill and tailwater recovery systems.

Construct facilities to capture and reuse district operational spills.

The design and operation of a contractor's conveyance system has a significant role in the quantity of annual operational spills.

A contractor should measure the annual spill from each canal and determine the percentage that could be captured for beneficial use. This data is essential to correctly site and size spill and tailwater recovery systems.

Interceptor systems can be designed to capture and transport operational spills throughout a conveyance system. One design adds lateral-connector canals. In this design, a secondary canal is constructed at the terminus point of a series of laterals to capture operational spill. The system is designed to either pump spills back into the laterals or transport them to a reservoir for storage.

The Imperial Irrigation District has a lateral interceptor, 5 miles in length, that captures operation spills from the terminus points of eight lateral canals and delivers the water to more than 22,000 acres of cultivated land. The interceptor has more than 90 automated drop leaf gates in addition

to a 240-AF reservoir for storage of spill water. The interceptor annually conserves approximately 8,300 AF of water.

8. Optimize conjunctive use of surface and ground water.

Increase planned conjunctive use of surface and ground water within the district.

Describe the potential for increased conjunctive use and identify programs to achieve this potential.

If feasible, contractors should prepare and implement long-range plans to conjunctively use surface water and ground water to meet current and future demands. Conjunctive use programs store surplus imported and local surface water in ground-water basins. When surface water is inadequate to meet demand, ground water is pumped and distributed.

The Arvin-Edison Water Storage District has an active conjunctive use program. The contractor utilizes two major spreading basins and a total of 55 recovery wells. During wet years, agricultural demand is adequately met with imported surface water. Surplus surface water is transported to the spreading basins and percolated into the ground-water basin. During years when the contractor's imported surface water supply will not meet demand, the contractor pumps the stored ground water. This conjunctive use program began in 1966. As of 1991, the contractor had stored approximately 1 million AF of water in the ground-water basin.

The costs to develop, implement, and maintain a conjunctive use program include funds to construct and maintain the spreading basins and to install and maintain the ground-water extraction wells. Where feasible, contractors may wish to develop programs with neighboring districts.

9. Automate canal structures.

Automation of canal structures may increase flexibility in water deliveries and increase the contractor's control over its water supplies; thereby, providing the opportunity to improve the efficiency of water use.

Estimate annual operation spills by reach. Identify locations for automated canal structures and other distribution system improvements. Estimate annual water savings (AF/Y) resulting from the evaluated projects. Describe program to automate distribution system.

10. Facilitate or promote water user pump testing and evaluation.

Describe the program to facilitate or promote water user pump testing and evaluation.

A contractor and the local utility can develop a cooperative pump testing service program for their customers. The program will benefit all involved parties by cutting down on energy demand, while providing ground water at the lowest possible price.

Several utility companies currently offer a free pump testing service to their customers. A pump test report discusses the condition of a pump and well and provides improvement recommendations.

C. Provide a 3-year Budget for Expenditures and Staff Effort for BMPs
(Current year and 2 projected years budget for all BMPs.)

3-Year Budget and Staff Time Summary

1. Amount actually spent last year.

Year _____		Total Budget	Staff Time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm	\$0	0	\$0
	CIMIS	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractor's pumps	\$0	0	\$0
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3	Facilitate financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater system	\$0	0	\$0
8	Optimize conjunctive use	\$0	0	\$0
9	Automate canal structures	\$0	0	\$0
10	Customer pump testing	\$0	0	\$0
	Total	\$0	0	\$0

2. Projected budget and staff time summary for the next 2 years.

Year _____		Total Budget	Staff Time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm	\$0	0	\$0
	CIMIS	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractors pumps	\$0	0	\$0
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3.	Facilitate financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater system	\$0	0	\$0
8	Optimize conjunctive use	\$0	0	\$0
9	Automate canal structures	\$0	0	\$0
10	Customer pump testing	\$0	0	\$0
	Total	\$0	0	\$0

Year _____		Total Budget	Staff time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm	\$0	0	\$0
	CIMIS	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractor's pumps	\$0	0	\$0

Year _____		Total Budget	Staff time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3	Facilitate financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater system	\$0	0	\$0
8	Optimize conjunctive use	\$0	0	\$0
9	Automate canal structures	\$0	0	\$0
10	Customer pump testing	\$0	0	\$0
	Total	\$0	0	\$0

Section 4: BMPs for Urban Contractors

Note: Now annual reporting can be submitted over the internet at <http://www.cuwcc.org/>.

These BMPs will be evaluated based on the CUWCC MOU, amended March 14, 2001. Under certain circumstances, the generally applicable practices may not be appropriate for contractor implementation. Contractors will implement each BMP unless the contractor provides adequate documentation for an exemption. BMP Number 4, Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections, is the only BMP which is not exemptible.

For each of the BMPs, please refer to the CUWCC's MOU Exhibit 1 (BMP Definitions, Schedules, and Requirements), which is included in this document. This section lays out the requirements for implementation, coverage, and documentation. We are also requiring contractors to complete the "Connection and Water Use Data" sheet and the "CUWCC BMP Implementation Plan" projection sheets for projected expenditure budget and staff hours for each BMP. This information can be found on the CD in the *Planner* and Guidebook.

Wholesalers must insure that their subcontractor's have adequate Plans found to meet the Criteria. Wholesalers may include subcontractors in a single Plan or require each retailer to prepare separate Plans. If retailers prepare their own Plan, the wholesaler should be involved to the extent necessary to insure it is found to meet the Criteria.

The purpose of preparing a Plan is for the contractor to implement the programs developed during the planning process. Each year contractors report on actual BMP activities, budget, and staffing during the previous year. They also report on expenditures and staffing levels for the coming projected year and provide information on planned activities.

Contractors should maintain regular records of BMP implementation activities to facilitate the completion of the Annual Update. The BMP records can be tracked in a variety of ways. Some methods are: Conservation staff recording data on their time sheets, week schedules, and special budget computer codes.

The BMPs listed here are intended to reduce long-term urban demands, and to better improve water management, in an effort to maximize the limited water resources available. These BMPs are in addition to programs that may be instituted during occasional water supply shortages.

For your convenience, the CUWCCs MOU Exhibit 1 is provided below.

1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Implementation

Implementation shall consist of at least the following actions:

- a. Develop and implement a strategy targeting and marketing water-use surveys to single-family residential and multi-family residential customers.
- b. Directly contact via letter or telephone not less than 20 percent of single-family residential customers and 20 percent of multi-family residential customers each reporting period.
- c. Surveys shall include indoor and outdoor components, and at minimum, shall have the following elements:

Indoor

- 1) Check for leaks, including toilets, faucets, and meter check.
- 2) Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, as necessary.
- 3) Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary

Outdoor

- 4) Check irrigation system and timers.
- 5) Review or develop customer irrigation schedule.

Recommended but not required

- 6) Measure currently landscaped area.
 - 7) Measure total irrigable area.
- d. Provide customer with evaluation results and water saving recommendations;

leave information packet with customer.

- e. Track surveys offered, surveys completed, survey results, and survey costs.

Coverage Requirements

a. Not less than 15 percent of single-family residential accounts to receive water-use surveys within 10 years of the date implementation was to commence. For the purposes of calculating coverage, 15 percent of single-family residential accounts means the number of accounts equal to 15 percent of single-family accounts in 1997 or the year the agency signed the MOU, whichever is later.

b. Not less than 15 percent of multi-family residential units to receive water-use surveys within 10 years of the date implementation was to commence. For the purposes of calculating coverage, 15 percent of multi-family residential units means the number of units equal to 15 percent of multi-family units in 1997 or the year the agency signed the MOU, whichever is later.

Requirements for Documenting BMP Implementation

- a. Number of single-family residential accounts in service area.
- b. Number of multi-family residential accounts in service area.
- c. Number of single-family residential surveys offered during reporting period.
- d. Number of single-family residential surveys completed during reporting period.
- e. Number of multi-family residential surveys offered during reporting period.
- f. Number of multi-family residential surveys completed during reporting period.

2. Residential Plumbing Retrofit

Implementation

Implementation shall consist of at least the following actions:

a. Identify single-family and multi-family residences constructed prior to 1992. Develop a targeting and marketing strategy to distribute or directly install high-quality, low-flow showerheads (rated 2.5 gpm or less), toilet displacement devices (as needed), toilet flappers (as needed), and faucet aerators (rated 2.2 gpm or less) as practical to residences requiring them.

b. Maintain distribution and/or direct installation programs so that devices are distributed to not less than 10 percent of single-family connections and multi-family units each reporting period, or require through enforceable ordinance the replacement of high-flow

showerheads and other water using fixtures with their low-flow counterparts, until it can be demonstrated in accordance with Section E of this Exhibit that 75 percent of single-family residences and 75 percent of multi-family units are fitted with high-quality, low-flow showerheads.

c. Track the type and number of retrofits completed, devices distributed, and program costs.

Coverage Requirements

a. Plumbing device distribution and installation programs to be maintained at a level sufficient to distribute high-quality, low-flow showerheads to not less than 10 percent of single-family residences and 10 percent of multi-family units constructed prior to 1992 each reporting period, or the enactment of an enforceable ordinance requiring the replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts.

b. Plumbing device distribution and installation programs to be operated until it can be demonstrated in accordance with Section E of this Exhibit that 75 percent of single-family residences and 75 percent of multi-family units are fitted with high-quality, low-flow showerheads.

Requirements for Documenting BMP Implementation

a. The target population of pre-1992 single-family residences and multi-family units to be provided showerheads and other water saving devices.

b. The number of showerhead retrofit kits distributed during previous reporting period.

c. The number of device retrofits completed during the previous reporting period.

d. The estimated percentage of pre-1992 single-family residences and multi-family units in service area fitted with low-flow showerheads.

3. *System Water Audits, Leak Detection, and Repair*

Implementation

Implementation shall consist of at least the following actions:

- a. Annually complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit shall be calculated as follows:
 - 1) Determine metered sales.
 - 2) Determine other system verifiable uses.
 - 3) Determine total supply into the system.
 - 4) Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full-scale system audit is indicated.
- b. When indicated, agencies shall complete water audits of their distribution systems using methodology consistent with that described in AWWA's Water Audit and Leak Detection Guidebook.
- c. Agencies shall advise customers whenever it appears possible that leaks exist on the customer's side of the meter; perform distribution system leak detection when warranted and cost effective; and repair leaks when found.

Coverage Requirements

- a. Agency shall maintain an active distribution system auditing program.
- b. Agency shall repair identified leaks whenever cost-effective.

Requirements for Documenting BMP Implementation

- a. Prescreening audit results and supporting documentation.
- b. Maintain in-house records of audit results or the completed AWWA audit worksheets for each completed audit period.

4. Metering With Commodity Rates for All New Connections and Retrofit of Existing Connections

Implementation

Implementation shall consist of at least the following actions:

- a. Requiring meters for all new connections and billing by volume of use.
- b. Establishing a program for retrofitting existing unmetered connections and billing by volume of use.
- c. Identifying intra- and inter-agency disincentives or barriers to retrofitting mixed-use commercial accounts with dedicated landscape meters, and conducting a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters.

Coverage Requirements

Hundred percent of existing unmetered accounts to be metered and billed by volume of use within 10 years of date implementation was to commence.

Requirements for Documenting BMP Implementation

- a. Confirmation that all new connections are metered and are being billed by volume of use.
- b. Number of unmetered accounts in the service area. For the purposes of evaluation, this shall be defined as the baseline meter retrofit target and shall be used to calculate the agency's minimum annual retrofit requirement.
- c. Number of unmetered connections retrofitted during the reporting period.
- d. Number of CII accounts with mixed-use meters.
- e. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.

5. Large Landscape Conservation Programs and Incentives

Implementation

Implementation shall consist of at least the following actions:

Customer Support, Education, and Assistance

Agencies shall provide non-residential customers with support and incentives to improve their landscape water-use efficiency. This support shall include, but not be limited to, the following:

Accounts with Dedicated Irrigation Meters

- a. Identify accounts with dedicated irrigation meters and assign ETo-based water-use budgets equal to no more than 100 percent of reference ET per square foot of landscape area in accordance with the schedule given in Section B.
- b. Provide notices each billing cycle to accounts with water-use budgets showing the relationship between the budget and actual consumption in accordance with the schedule given in Section B; agencies may choose not to notify customers whose use is less than their water-use budget.

CII Accounts with Mixed-Use Meters or Not Metered

- a. Develop and implement a strategy targeting and marketing large landscape water-use surveys to CII accounts with mixed-use meters. Each reporting period, directly contact via letter or telephone not less than 20 percent of CII accounts with mixed-use meters and offer water-use surveys. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both BMP 5 and BMP 9.)
- b. Unmetered service areas will actively market landscape surveys to existing accounts with large landscapes or accounts with landscapes which have been determined by the purveyor not to be water efficient.
- c. Offer the following measures when cost effective:
 - 1) Landscape water-use analysis/surveys.
 - 2) Voluntary water-use budgets.
 - 3) Installation of dedicated landscape meters

4) Training (multi-lingual, where appropriate) in landscape maintenance, irrigation system maintenance, and irrigation system design.

5) Financial incentives to improve irrigation system efficiency such as loans, rebates, and grants for the purchase and/or installation of water efficient irrigation systems.

6) Follow-up water-use analyses/surveys consisting of a letter, phone call, or site visit, where appropriate.

d. Survey elements will include: Measurement of landscape area; measurement of total irrigable area; irrigation system check, and distribution uniformity analysis; review or develop irrigation schedules, as appropriate; and provision of a customer survey report and information packet.

e. Track survey offers, acceptance, findings, devices installed, savings potential, and survey cost.

New or Change of Service Accounts

Provide information on climate-appropriate landscape design, efficient irrigation equipment/management to new customers and change-of-service customer accounts.

Recommended

a. Install climate appropriate water efficient landscaping at water agency facilities, and dual metering, where appropriate.

b. Provide customer notices prior to the start of the irrigation season alerting them to check their irrigation systems and make repairs as necessary. Provide customer notices at the end of the irrigation season advising them to adjust their irrigation system timers and irrigation schedules.

Coverage Requirements

a. ETo-based water-use budgets developed for 90 percent of CII accounts with dedicated irrigation meters by the end of the second reporting period from the date implementation was to commence.

b. Not less than 20 percent of CII accounts with mixed-use meters contacted and

offered landscape water-use surveys each reporting period.

c. Irrigation water-use surveys completed for not less than 15 percent of CII accounts with mixed-use meters within 10 years of the date implementation was to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both BMP 5 and BMP 9.) For the purposes of calculating coverage, 15 percent of CII accounts means the number of accounts equal to 15 percent of CII accounts with mixed-use meters in 1997 or the year the agency signed the MOU, whichever is later.

Requirements for Documenting BMP Implementation

Dedicated Landscape Irrigation Accounts

Agencies shall preserve water-use records and budgets for customers with dedicated landscape irrigation accounts for a period of not less than two reporting periods. This information may be used by the CUWCC to verify the agency's reporting on this BMP.

- a. Number of dedicated irrigation meter accounts.
- b. Number of dedicated irrigation meter accounts with water budgets.
- c. Aggregate water use for dedicated landscape accounts with budgets.
- d. Aggregate budgeted water use for dedicated landscape accounts with budgets.

Mixed-Use Accounts

- a. Number of mixed-use accounts.
- b. Number, type, and dollar value of incentives, rebates, and no, or low interest loans offered to, and received by, customers.
- c. Number of surveys offered.
- d. Number of surveys accepted.
- e. Estimated annual water savings by customers receiving surveys and implementing recommendations.

6. High-Efficiency Washing Machine Rebate Programs

Implementation

Implementation shall consist of at least the following actions:

CUWCC Actions and Responsibilities

a. Within 6 months from the adoption of this BMP, the CUWCC will develop interim estimates of reliable water savings attributable to the use of high-efficiency washing machines based on the results of the THELMA Study and other available data. Water purveyors may defer implementing this BMP until the CUWCC has adopted these interim estimates. (Note: Interim Estimate of Reliable Water Savings Adopted by the CUWCC Plenary, April 8, 1998, see Section F.)

b. Within 2 years from the adoption of this BMP, the CUWCC will complete studies quantifying reliable savings attributable to the use of high-efficiency washing machines.

c. At the end of 2 years following the adoption of this BMP, the CUWCC will appoint a committee to evaluate the effectiveness of triggering high-efficiency washing machine financial incentive programs operated by MOU signatories with programs operated by energy service providers. This committee will consist of two group one representatives, two group two representatives, and the CUWCC Administrator or Executive Director or his/her designee. This BMP will be modified by the appointed committee to require agencies to implement financial incentive programs for high-efficiency washing machines whenever cost-effective and regardless of the absence of a program operated by an energy service provider, if the committee concludes from available evidence the following:

1) CUWCC has verified that significant water savings are available from high-efficiency washing machines.

2) There is widespread product availability.

3) Financial incentive programs offered by energy service providers in California have either not materialized, been largely discontinued, or have significantly scaled back.

Water Purveyor Responsibilities

a. In conjunction with the CUWCC, support local, State, and Federal legislation to improve efficiency standards for washing machines.

b. If an energy service provider or waste water utility within the service territory

is offering a financial incentive for the purchase of high-efficiency washing machines, then the water agency shall also offer a cost-effective financial incentive based on the marginal benefits of the water savings. Incentive levels shall be calculated by using methods found in A Guide to Customer Incentives for Water Conservation prepared by Barakat and Chamberlain for California urban water agencies, the CUWCC, and the U.S. Environmental Protection Agency, February 1994. A water purveyor is not required to implement a financial incentive program, if the maximum cost-effective rebate is less than \$50.

Coverage Requirements

Cost-effective customer incentive for the purchase of high-efficiency washing machine offered, if incentives are being offered by local energy service providers or waste water utility.

Requirements for Documenting BMP Implementation

- a. Customer incentives to purchase high-efficiency washing machines being offered by local energy service providers, if any.
- b. Customer incentives to purchase high-efficiency washing machines being offered by agency, if any.

7. Public Information Programs

Implementation

Implementation shall consist of at least the following actions:

- a. Implement a public information program to promote water conservation and water conservation related benefits.
- b. Program should include, but is not limited to, providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gallons per day for the last billing period compared to the same period the year before; providing public information to promote water conservation practices; and coordinating with other government agencies, industry groups, public interest groups, and the media.

Coverage Requirements

Agencies shall maintain an active public information program to promote and educate customers about water conservation.

Requirements for Documenting BMP Implementation

- a. Number of public speaking events relating to conservation during reporting period.
- b. Number of media events relating to conservation during reporting period.
- c. Number of paid or public service announcements relating to conservation produced or sponsored during reporting period.
- d. Types of information relating to conservation provided to customers.
- e. Annual budget for public information programs directly related to conservation.

8. School Education Programs

Implementation

Implementation shall consist of at least the following actions:

- a. Implement a school education program to promote water conservation and water conservation related benefits.
- b. Programs shall include working with school districts and private schools in the water suppliers' service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Education materials shall meet the State education framework requirements and grade-appropriate materials shall be distributed to grade levels K-3, 4-6, 7-8, and high school.

Coverage Requirements

Agencies shall maintain an active school education program to educate students in the agency's service areas about water conservation and efficient water uses.

Requirements for Documenting BMP Implementation

- a. Number of school presentations made during reporting period.
- b. Number and type of curriculum materials developed and/or provided by water supplier, including confirmation that curriculum materials meet State education framework requirements and are grade-level appropriate.
- c. Number of students reached.
- d. Number of in-service presentations or teacher's workshops conducted during reporting period.
- e. Annual budget for school education programs related to conservation.

9. Conservation Programs for CII Accounts

Implementation

Implementation shall consist of at least the following actions:

BOTH (a) AND (b)

a. CII Accounts

Identify and rank CII accounts (or customers, if the agency chooses to aggregate accounts) according to water use. For purposes of this BMP, CII accounts are defined as follows:

1) Commercial Accounts: Any water use that provides or distributes a product or service, such as hotels, restaurants, office buildings, commercial businesses, or other places of commerce. These do not include multi-family residences, agricultural users, or customers that fall within the industrial or institutional classifications.

2) Industrial Accounts: Any water users that are primarily manufacturers or processors of materials as defined by the SIC code numbers 2000 through 3999.

3) Institutional Accounts: Any water-using establishment dedicated to public service. This includes schools, courts, churches, hospitals, and government facilities. All facilities serving these functions are to be considered institutions regardless of ownership.

b. 3-Year Interim CII ULFT Program

Implementation shall consist of at least the following actions:

1) A program to accelerate replacement of existing high-water-using toilets with ULFTs (1.6 gallons or less) in CII facilities.

2) Programs shall be at least as effective as facilitating toilet replacements over a 3-year implementation period, commencing July 1, 2001, sufficient to produce cumulative water savings over 10 years equal to 3 percent of total water savings potential, as defined by Exhibit 8.

3) Annual reporting to the CUWCC of all available information described in Section D, subsection (b) of this BMP. The CUWCC shall develop and provide agencies with a concise reporting form by March 31, 2001.

4) By July 1, 2004, a committee selected by the CUWCC Steering Committee (Steering Committee) shall complete for submittal to the Steering Committee, a written evaluation of the interim program, including an assessment of program designs, obstacles to implementation, program costs, estimated water savings, and cost effectiveness. By August 2004, the Steering Committee will reconvene to review the evaluation and recommend to the CUWCC Plenary the next course of action on BMP 9 targets for CII toilet replacement programs.

AND EITHER (c) OR (d)

c. CII Water-Use Survey and Customer Incentives Program

Implement a CII Water-Use Survey and Customer Incentives Program. Develop a customer targeting and marketing strategy to provide water-use surveys and customer incentives to CII accounts such that 10 percent of each CII sector's accounts are surveyed within 10 years of the date implementation is to commence. Directly contact (via letter, telephone, or personal visit) and offer water-use surveys and customer incentives to at least 10 percent of each CII sector on a repeating basis. Water-use surveys must include a site visit, an evaluation of all water-using apparatus and processes, and a customer report identifying recommended efficiency measures, their expected payback period and available agency incentives. Within 1 year of a

completed survey, follow-up via phone or site visit with customer regarding facility water use and water saving improvements. Track customer contacts, accounts (or customers) receiving surveys, follow-ups, and measures implemented. The method for crediting water-use surveys completed prior to the revision of this BMP is described in Section E.

d. CII Conservation Performance Targets

Achieve a water-use reduction in the CII sectors equaling or exceeding the CII conservation performance target. Implement programs to achieve annual water-use savings by CII accounts by an amount equal to 10 percent of the baseline use of CII accounts in the agency's service area over a 10-year period. The target amount of annual water-use reduction in CII accounts is a static value calculated from the baseline amount of annual use. Baseline use is defined as the use by CII accounts in 1997. Water purveyors may justify to the CUWCC the use of an alternative baseline year.

Coverage Requirements

a. 3-Year CII ULFT Program

CII ULFT program water savings equal to 3 percent of total water savings potential, as defined by Exhibit 8.

EITHER

b. CII Water-Use Survey and Customer Incentives Program

Ten percent of each of the CII sector's accounts to accept a water-use survey within 10 years of the date implementation is to commence. For the purposes of calculating coverage, 10 percent of CII accounts means the number of accounts equal to 10 percent of CII accounts in 1997 or the year the agency signed the MOU, whichever is later.

OR

c. CII Conservation Performance Targets

Reduce annual water use by CII accounts by an amount equal to 10 percent of the annual baseline water use within 10 years of the date implementation is to commence, including savings resulting from implementation of Section A (b)--CII ULFTs.

Requirements for Documenting BMP Implementation

a. CII Accounts

The number of accounts (or customers) and amount of water use within each of the CII sectors.

b. 3-Year Interim CII ULFT Replacement Program

1) Customer participant information, including retail water utility account, primary contact information, facility address, facility type, number of toilets being replaced, number of toilets in facility (if available), primary reasons for toilet replacement, and program participation (if available).

2) Number of CII ULFTs replaced or distributed by CII subsector by year.

3) Total program cost by year, including administration and overhead, labor (staff salaries and benefits), marketing, outside services, incentives, and implementation (agency installation, rebate, permitting, and remedial costs), and any required evaluation and reporting by the CUWCC. Costs for program development and program operation shall be reported separately.

4) Total program budget by year.

5) Program funding sources by year, including intra-agency funding mechanisms, inter-agency cost sharing, and State/Federal financial assistance sources.

6) Description of program design and implementation, such as types of incentives, marketing, advertising methods and levels, customer targeting methods, customer contact methods, use of outside services (e.g., consultants or community-based organizations), and participant tracking and follow up.

7) Description of program acceptance or resistance by customers, any obstacles to implementation, and other issues affecting program implementation or effectiveness.

8) General assessment of program effectiveness.

AND EITHER (c) OR (d)

c. CII Water-Use Survey and Customer Incentives Program

- 1) The number of CII accounts (or customers) offered water-use surveys during the reporting period.
- 2) The number of new water-use surveys completed during the reporting period.
- 3) The number of follow-ups completed during the reporting period.
- 4) The type and number of water saving recommendations implemented.
- 5) Agency's program budget and actual program expenditures.

d. CII Conservation Performance Target

The estimated reduction in annual water use for all CII accounts due to agency programs, interventions, and actions. Agencies must document how savings were realized and the method and calculations for estimating savings, including the savings resulting from agency-assisted CII ULFTs replacements under Section A(b).

10. Wholesale Agency Assistance Programs

Implementation

Implementation shall consist of at least the following actions:

Financial Support

- a. Wholesale water suppliers will provide financial incentives, or equivalent resources, as appropriate and beneficial, to their retail water agency customers to advance water conservation efforts and effectiveness.
- b. All BMPs implemented by retail water agency customers, which can be shown to be cost-effective in terms of avoided cost of water from the wholesaler's perspective, using the CUWCC cost-effectiveness analysis procedures, will be supported.

Technical Support

Wholesale water agencies shall provide conservation-related technical support and information to all retail agencies for whom they serve as a wholesale supplier. At a minimum this requires:

- c. Conducting or funding workshops addressing the following topics:
 - 1) The CUWCC procedures for calculating program savings, costs, and cost effectiveness.
 - 2) Retail agencies' BMP implementation reporting requirements.
 - 3) The technical, programmatic, strategic or other pertinent issues and developments associated with water conservation activities in each of the following areas: ULFT replacement; residential retrofits; CII surveys; residential and large turf irrigation; and conservation-related rates and pricing.
- d. Having the necessary staff or equivalent resources available to respond to retail agencies' technical and programmatic questions involving the CUWCC's BMPs and their associated reporting requirements.

Program Management

- e. When mutually agreeable and beneficial, the wholesaler may operate all or any part of the conservation-related activities which a given retail supplier is obligated to implement under the BMP's cost-effectiveness test. The inability or unwillingness of the wholesaler to perform this function, however, in no way relieves or reduces the retailer's obligation to fully satisfy the requirements of all BMPs which are judged cost effective from the retailer's perspective.

Water Shortage Allocations

- f. Wholesale agencies shall work in cooperation with their customers to identify and remove potential disincentives to long-term conservation created by water shortage allocation policies and to identify opportunities to encourage and reward cost-effective investments in long-term conservation shown to advance regional water supply reliability and sufficiency.

Coverage Requirements

- a. Cost-effectiveness assessments completed for each BMP the agency is

potentially obligated to support. The methodology used will conform to the CUWCC's standards and procedures, and the information reported will be sufficient to permit independent verification of the cost-effectiveness calculations and of any exemptions claimed on cost-effectiveness grounds.

b. Agency avoided cost per acre-foot of new water supplies. The methodology used will conform to the CUWCC's standards and procedures, and the information reported will be sufficient to permit independent verification of the avoided cost calculations.

c. The total monetary amount of financial incentives and equivalent resources provided to retail members to assist, or to otherwise support, the implementation of BMPs.

d. The total amount of verified water savings achieved by each wholesaler-assisted BMP.

Requirements for Documenting BMP Implementation

a. The total monetary amount of financial incentives and equivalent resources provided to retail members to assist, or to otherwise support, the implementation of BMPs, subtotaled by BMP.

b. The total amount of verified water savings achieved by each wholesaler-assisted BMP.

11. Conservation Pricing

Implementation

Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good-faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

a. Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components: Rates in which the unit price decreases as the quantity used increases (declining block rates); rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used; and pricing in which the typical bill is determined by high-fixed charges and low commodity charges.

b. Conservation pricing provides incentives to customers to reduce average or peak

use, or both. Such pricing includes: Rates designed to recover the cost of providing service; and billing for water and sewer service based on metered water use. Conservation pricing is also characterized by one or more of the following components: Rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates); seasonal rates or excess-use surcharges to reduce peak demands during summer months; and rates based upon the long-run marginal cost or the cost of adding the next unit of capacity to the system.

c. Adoption of lifeline rates for low income customers will neither qualify nor disqualify a rate structure as meeting the requirements of this BMP.

CUWCC Rate Impact Study

Within 1 year of the adoption of this BMP revision, the CUWCC shall undertake a study to determine the relative effect of conservation rate structure influence on landscape and indoor water use. The study shall develop sample areas that incorporate varying rate structure environments (e.g., low, uniform commodity rates; high, uniform commodity rates; increasing block rates, etc.). As practical, the study shall utilize direct metering of customer end uses and shall control for weather, climate, land use patterns, income, and other factors affecting water-use patterns. If the study shows significant potential savings, as determined by a balanced committee of voting CUWCC representatives, a revised pricing BMP containing numeric targets or other appropriate standards shall be developed for a CUWCC vote.

Coverage Requirements

Agency shall maintain rate structure consistent with BMP 11's definition of conservation pricing.

Requirements for Documenting BMP Implementation

- a. Report annual revenue requirement by customer class for the reporting period.
- b. Report annual revenue derived from commodity charges by customer class for the reporting period.
- c. Report rate structure by customer class for water service and sewer service, if provided.

12. Conservation Coordinator

Implementation

Implementation shall consist of at least the following actions:

a. Designation of a water conservation coordinator and support staff (if necessary), whose duties shall include the following:

- 1) Coordination and oversight of conservation programs and BMP implementation.
- 2) Preparation and submittal of the CUWCC BMP Implementation Report.
- 3) Communication and promotion of water conservation issues to agency senior management; coordination of agency conservation programs with operations and planning staff; preparation of annual conservation budget; participation in the CUWCC, including regular attendance at CUWCC meetings; and preparation of the conservation elements of the agency's urban Plan.

b. Agencies jointly operating regional conservation programs are not expected to staff duplicative and redundant conservation coordinator positions.

Coverage Requirements

Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.

Requirements for Documenting BMP Implementation

- a. Conservation coordinator name, staff position, and years on the job.
- b. Date conservation coordinator position created by agency.
- c. Number of conservation coordinator staff.
- d. Duties of conservation coordinator and staff.

13. Water Waste Prohibition

Implementation

Implementation methods shall be enacting and enforcing measures prohibiting gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.

Signatories shall also support efforts to develop State law regarding exchange-type water softeners that would:

- a. Allow the sale of only more efficient, demand-initiated regenerating (DIR) models.
- b. Develop minimum appliance efficiency standards that
 - 1) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.
 - 2) Implement an identified maximum number of gallons discharged per gallon of soft water produced.
- c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the re-claimed water or ground-water supply.

Signatories shall also include water softener checks in home water audit programs and include information about DIR and exchange-type water softeners in their educational efforts to encourage replacement of less efficient timer models.

Coverage Requirements

Agency shall adopt water waste prohibitions consistent with the provisions for this BMP specified in Section A.

Requirements for Documenting BMP Implementation

Description of water waste prohibition ordinances enacted in service area.

14. Residential ULFT Replacement Programs

Implementation

Implementation shall consist of at least the following actions:

- a. Implementation of programs for replacing existing high-water-using toilets with ULFTs (1.6 gallons or less) in single-family and multi-family residences.
- b. Programs shall be at least as effective as requiring toilet replacement at time of resale; program effectiveness shall be determined using the methodology for calculating water savings in Exhibit 6.

After extensive review, on July 30 1992, the CUWCC adopted Exhibit 6, Assumptions and Methodology for Determining Estimates of Reliable Savings from the Installation of ULFT. Exhibit 6 provides a methodology for calculating the level of effort required to satisfy BMP 14.

Coverage Requirements

Water savings from residential ULFT replacement programs to equal or exceed water savings achievable through an ordinance requiring the replacement high-water-using toilets with ULFTs upon resale, and taking effect on the date implementation of this BMP was to commence and lasting 10 years.

Requirements for Documenting BMP Implementation

- a. The number of single-family residences and multi-family units in service area constructed prior to 1992.
- b. The average number of toilets per single-family residence; the average number of toilets per multi-family unit.
- c. The average persons per household for single-family residences; the average persons per household for multi-family residences.
- d. The housing resale rate for single-family residences in service area; the housing resale rate for multi-family residences in service area.
- e. The number of ULFT installations credited to the agency's replacement program, by year.
- f. Description of ULFT replacement program.

- g. Estimated cost per ULFT replacement.
- h. Estimated water savings per ULFT replacement.

Section 5: Plan Implementation

Pursuant to water service and settlement contract terms, contractors must report on Plan implementation annually.

Agricultural contractors can complete an annual update by filling in the information for BMPs on the WaterShare web site at <http://watershare.mp.usbr.gov/>.

Urban contractors can complete an annual update by filling in the information for urban BMPs on the CUWCC web site. Contractors who are signatories of the CUWCC are currently submitting annual reports via the CUWCC's *BMP Reporting Database* located on their web site at www.cuwcc.org. Through an agreement with the CUWCC, Reclamation's urban non-signatories may now submit their annual reports through the CUWCC's web site using "guest accounts." Urban BMPs are reviewed based on the CUWCC's MOU (amended March 14, 2001).

Section 6: Exemption Process

Intent:

To demonstrate in a clear and concise manner that a BMP is not cost effective, not financially feasible, not legal, or not environmentally possible for a contractor to implement. For agricultural contractors, only the BMPs in the exemptible section (B. BMPs) are exemptible. For urban contractors, all BMPs, except BMP 4 (metering), are exemptible.

Evaluation:

Some BMPs are not appropriate or possible for a contractor to implement. To document an exemption, provide the basis, rationale, and details for excluding a BMP. Such documentation must address, as appropriate, cost effectiveness, financial feasibility, and environmental or legal constraints to BMP implementation. Reclamation will also consider exemption requests prepared using the final AWMC exemption process or the CUWCC exemption process.

Detail Expected in an Adequate BMP Exemption:

Legal Restraints

In order to justify a BMP exemption because it would not be legal for the contractor to implement, detail the following:

1. A list of any known laws, regulations, court decisions, or other legal constraints that make it illegal for the contractor to implement the BMP.
2. A list of the steps that would be required to remove these constraints.
3. A description of what steps the contractor has taken to remove these constraints.
4. Documentation of efforts by the contractor to work with other entities that would have the legal authority to carry out the BMP within the contractor's service area.

Environmental Constraints

In order to justify an exemption due to known adverse environmental impacts, the Plan must document the critical environmental issues and known (qualitative and/or quantitative) negative impacts of the BMP, and an explanation of why effective mitigation of these impacts is not possible. If mitigation of the environmental impacts is possible, the practice must be implemented unless it can be exempted by another exemption category. For example, if the

mitigation costs make the project economically infeasible, a discussion of the mitigation plan and necessary mitigation costs should be included as a part of the economic analysis.

Economic Constraints

1. In order to justify an exemption due to economic constraints, the Plan must document the following:

A benefit-cost analysis that demonstrates the costs to the contractor outweigh the benefits to the contractor over the life of the measure. The contractor must perform the analysis by comparing the present value of all benefits to the present value of all costs. Document the projected/estimated benefits and costs and the methodology for analysis (benefits and costs should be quantified to the extent possible). The analysis performed for each excluded BMP (from the contractor's perspective) must include, but is not limited to, the following benefits and costs:

Benefits

All capital costs avoided by the contractor which include, but are not limited to, the costs associated with the development of new supplies (studies, construction, labor, etc.), transportation, the required increase in storage, distribution capacity, waste water facilities, and treatment capacity, etc.

- a. Operation and maintenance costs associated with the decrease in the production and distribution of water or the treatment and disposal of waste water that include, but are not limited to, energy, labor, treatment, storage, drainage treatment and disposal, etc.
- b. Water purchases avoided by the contractor.
- c. Environmental costs avoided by the contractor.
- d. Environmental enhancements.
- e. Revenues from other entities that include, but are not limited to, revenue from the sale of water made available by the BMP, financial incentives received from other entities, etc.
- f. Other benefits to the contractor customers that include, but are not limited to, hydropower, improved crop yields, improved crop quality, labor savings, fertilizer savings, increased farm income, etc.

Costs

- a. Capital expenditures incurred by the contractor for Implementation of the BMP that include, but are not limited to, equipment, supplies, materials, construction, etc.
- b. Operation and maintenance costs to plan, design, implement, enforce, and evaluate the practice.
- c. Financial incentives to customers.
- d. Costs to the environment.
- e. Other costs to the contractor.

Several accepted benefit-cost analysis methodologies exist (California Energy Commission's Integrated Resource Planning Methodology, Generally Accepted Accounting Principles, Agricultural Water Management Council's Net Benefit Analysis, etc.). A contractor is considered to be the best suited to evaluate their own economic situation with an appropriate methodology.

2. A discussion and quantification, to the extent possible, of other benefits associated with the implementation of the BMP that may be of interest to potential partners, but are not the direct sole responsibility of the contractor.

Financial Constraints

In order to adequately justify an exemption due to financial constraints, the Plan must clearly document the following:

1. The benefits and costs of the BMP to the contractor.
2. The contractor's funding needed to implement the BMP.
3. A discussion regarding why the contractor cannot finance the BMP through rate adjustments, assessments, etc.
4. A discussion of the contractor's reasonable efforts to secure funding from other entities that include, but are not limited to, lending institutions and bonding authorities, and an explanation of why these entities would not provide funding.
5. The required amount of a grant or subsidy that would be needed to feasibly implement the BMP if financing or partnerships could not be obtained.

Section 7: Regional Criteria

There are no regional criteria at this time. If in the future regional criteria are considered, they will be developed as a separate document.

Section 8: Five-Year Plan Revision Procedure

Revision Process

Pursuant to water service and settlement contract terms, contractors are required to submit revised Plans every 5 years. Contractors must use the most recently adopted Criteria for a new Plan or a 5-year Plan revision. The contractor must continue to file an Annual update every year to report implementation actions taken.

Review Process

Contractors are requested to submit draft plans to the area office for review and forwarding to Reclamation's Regional Office. Once forwarded to the Regional Office, contractors will receive, within 90 days, notification of Reclamation's acceptance or request for modification. Following notification by Reclamation that the Plan has conditionally met the requirements of the Criteria, contractors must submit three copies of the completed Plan and a resolution by the contractor's Board formally adopting the Plan. The status of the contractor's Plan will then be noticed in the *Federal Register*, and the public is given 30 days in which to comment. Copies of the document will be available for review at the Regional Office and the appropriate area office. If no comments are received within 30 days, the review process will be officially complete. If public comments are received, additional changes may be required.

Signatories to the AWMC

Contractors who are signatories of the AWMC should also submit the Plan to the AWMC after notification by Reclamation that the Plan has conditionally met the requirements of the Criteria. The AWMC will review the agricultural Plans using Reclamation's Criteria. The AWMC may provide comments to Reclamation within 30 days of receiving the agricultural Plan. Reclamation will review the AWMC comments as part of its concurrent review of the Plan. The goal is to have the contractor's Plan meet the requirements of both AWMC and Reclamation.

Consequences of Non-Compliance

Under most conditions, an adequate Plan must be in place before Reclamation will consider extending any discretionary benefits. Discretionary benefits include, but are not limited to, funding through the Water Conservation Field Services Program or the Efficiency Incentive Program (except for Plan development), and assistance from Reclamation sponsored technical assistance programs.

Attachment A

Information Required of Contractors Located in a Drainage Problem Area

Contractor's included in the drainage problem area, as identified in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990), are listed, by sub-area, below. If future editions of the drainage report revise the boundaries of a drainage problem area or other factors used to determine which contractors are in a drainage problem area, Reclamation will revise Attachment A to conform with the current drainage report.

1. Reclamation contractors in the **Grasslands subarea**: Broadview Water District, Central California Irrigation District, Del Puerto Water District, Firebaugh Canal Water District, Mercy Springs Water District, Pacheco Water District, Panoche Water District, San Luis Canal Company, and San Luis Water District.
2. Reclamation contractors in the **Westlands subarea**: James Irrigation District, Tranquillity Irrigation District, and Westlands Water District.
3. Reclamation contractors in the **Tulare subarea**: Alpaugh Irrigation District, Atwell Island Water District, Lower Tule River Irrigation District, and Pixley Irrigation District.
4. Reclamation contractors in the **Kern subarea**: Alpaugh Irrigation District.

Contractors listed above shall describe which recommendations prescribed in A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990) have been incorporated in their water conservation programs to improve conditions in drainage problem areas. These recommendations include:

1. Source Control
2. Land Retirement
3. Drainage Water Treatment
4. Drainage Water Reuse
5. Shallow Ground-Water Pumping
6. Evaporation Ponds

Provide a description and level of expenditure for each activity designed to address the recommendations of the San Joaquin Valley Drainage Program. Identify how implementation of the recommendations has or will substantially reduce deep percolation on drainage problem lands. Describe which recommendations have not been implemented and why.

Attachment B
N/A of Exemptible BMPs

To establish that a BMP is not applicable to the contractor, the Plan should explain the reasons why the BMP does not apply to the contractor. This justification must be consistent with Section 1 of the Criteria entitled, “Describe the District.” Examples of N/A for each exemptible BMP are listed below. This list is not all inclusive.

Section 3. B. Exemptible BMPs for Agricultural Contractors

1. *Facilitate Alternative Land Use* - N/A could include: Districts without irrigable lands that have exceptionally high water duties or whose irrigation does not contribute to significant problems.
2. *Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils* - N/A could include: Completely piped systems that do not have delivery constraints.
4. *Facilitate the financing of capital improvements for on-farm irrigation systems* - None identified.
4. *Incentive pricing* - District that receives only class 2 water.
5. a) *Line or pipe ditches and canals* - N/A could include: Completely piped systems, unlined systems or sections or systems which are used as part of a planned conjunctive use program.

b) *Regulatory reservoirs* - N/A could include: Completely piped systems that do not have delivery constraints.
6. *Increase flexibility in water ordering by, and delivery to, the water users within operational limits* - None identified.
7. *Construct and operate district spill and tailwater recovery systems* - N/A could include: Completely piped systems that do not have delivery constraints.
8. *Optimize conjunctive use of surface and ground water* - N/A could include: Districts which do not overlie a useable ground-water basin and thus neither the district nor its customers pump or use ground water.
9. *Automate canal structures* - N/A could include: Completely piped systems that do not have delivery constraints.

Attachment C
Assess QOs

CALFED is developing QOs that provide incentives for participation by water users including contractors in water management activities. These activities may or may not directly benefit the water user/contractor. If there are CALFED QOs that apply to the geographic location of your agency lands, identify the QOs that apply to your agency and comment on the potential for contractor participation. Evaluate and comment on any BMP or practice that is complementary, or could be complementary to the QOs identified in the district's service area. To see if your agency has QOs that apply, please refer to the section in the back of the planner entitled, "QOs by Agency." Find your agency in the alphabetical list. Review the QOs listed for your agency and comment on your agency's interest in obtaining funding to address the QO. Evaluate and comment on any BMP or practice that is complementary or could be complementary to the QOs in the district.

Attachment D
Crop List

barley
corn - field
oats
rice
sorghum
wheat
other cereals

alfalfa
clover
irrigated pasture
other hay
silage
other forage

cotton
hops
safflower
sugar beats
soybeans
other field crops

asparagus
beans
broccoli

cabbage
carrots
cauliflower
celery
corn
cucumbers
garlic
greens
lettuce
melons
onions
peas
peppers
potatoes
squash
tomatoes
other vegetables

Sudan grass
Bermuda grass
other grasses

apples
apricots
avocados

berries (all kinds)
cherries
grapefruit
lemon / limes
oranges / tangerines
dates
grapes
olives
peaches
pears
prunes / plums
strawberries
other fruits

almonds
pecans
pistachios
walnuts
other nut trees

ornamental nursery
joboba
other

Irrigation Methods List

Level basin, 1/4 mile
Level basin, 1/8 mile
Graded, surface 1/2 miles
Graded, surface 1/4 miles
Graded, surface 1/8 mile
Sprinkler, center pivot
Sprinkler, linear move
Sprinkler, solid set
Sprinkler, hand move
Trickle, spray
Trickle, subsurface
Trickle, surface